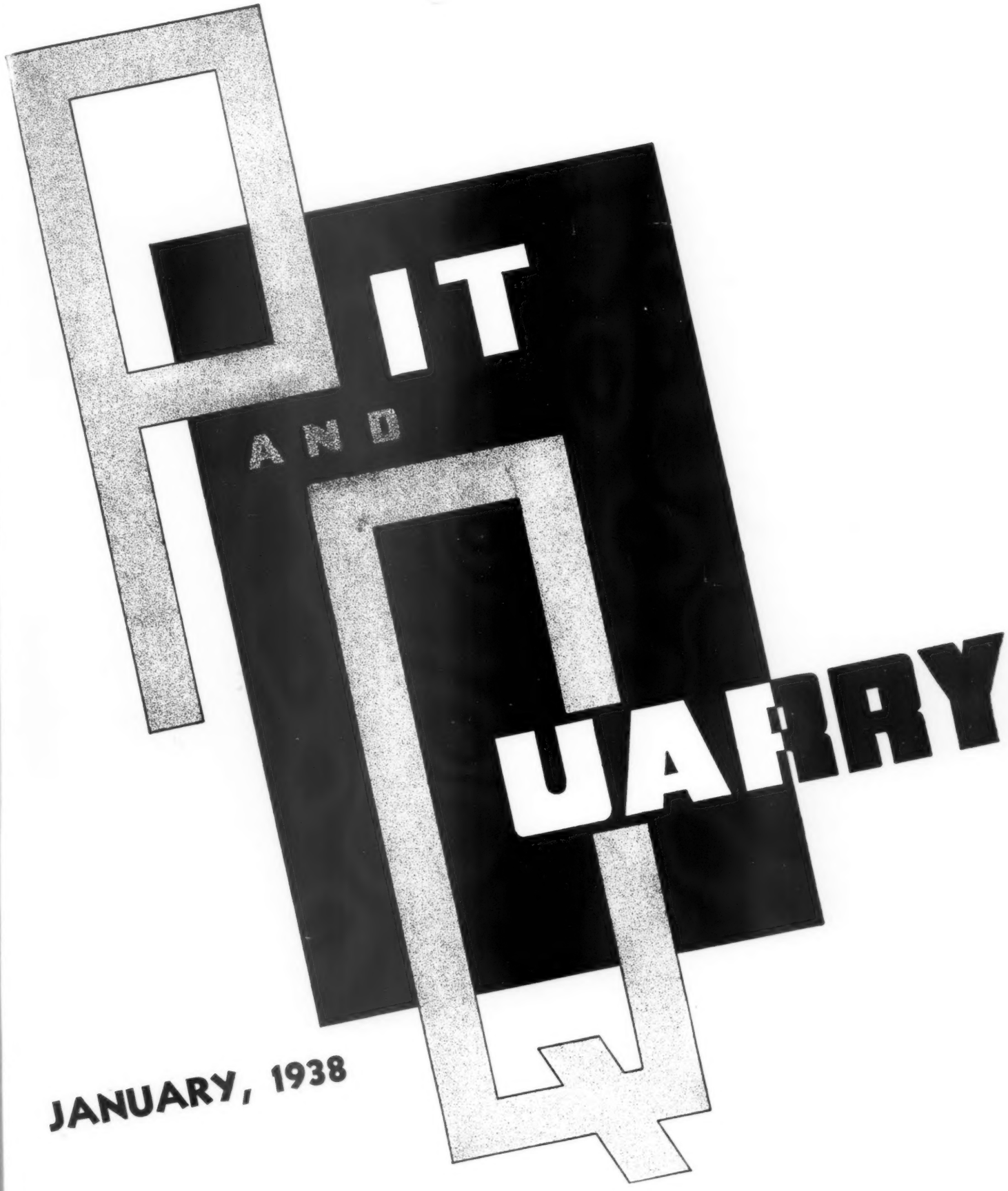

JANUARY, 1938

Review of 1937 Plant Progress in the Pit-and-Quarry Industries . . . The January-February Conventions . . . New Plant of Gulf Portland Cement Co. Nearing Completion at Houston, Tex.

TN1
.P65

Write us describing your pumping conditions and we will send you the names of concerns using Hydroseal Pumps under similar conditions. Then, you can write them direct asking anything you want to know about the economies and performance of this unusual pump. If you prefer, send for our new thirty-six-page catalog No. 937, or if desired, one of our representatives (located in all principal cities) will call.

HYDROSEAL MAXIMIX RUBBER PROTECTED DREDGE PUMPS

HYDROSEAL AND MAXIMIX DESIGNS ARE COVERED BY PATENTS AND APPLICATIONS IN THE MAJOR MINING CENTERS OF THE WORLD AND CAN BE PURCHASED ONLY THROUGH THESE COMPAN

U. S. A.: THE ALLEN-SHERMAN-HOFF CO. 223 S. 15th St., Philadelphia, Pa. **CANADA:** ALLEN-SHERMAN-HOFF, LTD. 602 Colonial Bldg., 11 King St., West, Toronto, Ont. **ENGLAND:** THE ASH CO. (LONDON), LTD. 79/80 Petty France, Westminster, S.W. 1, London **PHILIPPINE ISLANDS:** ATKINS, KROLL & CO., I Insular Life Bldg., Manila

SOUTH AFRICA: THE DENVER MACHINERY CO., LTD., 206 Commissioner St., Johannesburg **AUSTRALIA:** CROSSLE & DUFF PTY., LTD., 360 Collins Street, Melbourne

PRINT IN B

See us at the Shows:

1938 ROAD SHOW

Visit space A-10 at Cleveland, Jan. 17-21, and see and operate the Link-Belt Speed-o-Matic shovel-dragline-crane—the machine that applies time-proved hydraulic pressure control to all its operating functions. It puts manual-lever operated shovels back in the class with automobiles you had to crank by hand.

NATIONAL CRUSHED STONE SHOW
Cincinnati Jan. 24-26

We again extend to the members of these three Associations a cordial welcome to our exhibit (spaces 12-13-14) of modern preparation, handling and power transmitting equipment. A number of new and interesting developments will be shown.

NATIONAL SAND & GRAVEL AND READY MIXED CONCRETE SHOW
Cincinnati Jan. 31-Feb. 3

Send for Catalogs

No. 700 General Catalog
No. 1240 Washing Sand and Gravel
No. 1463 Dewatering Rotoscoop
No. 1562 Vibrating Screens
No. 1795 Speed-o-Matic Shovels
No. 2100 Positive Drives

LINK-BELT COMPANY

CHICAGO
PHILADELPHIA INDIANAPOLIS
ATLANTA SAN FRANCISCO
TORONTO

Offices in Principal Cities

7253

LINK-BELT
Equipment for Handling Sand, Gravel, Stone

PIT AND QUARRY, January, 1938. Vol. 30, No. 7. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago, Ill. Subscription price $1 for 1 year in the U. S. and possessions, Canada and Central South America; elsewhere $1 additional for each year. Single copies 20 cents. Entered as second-class matter November 28, 1932, at the Post-Office at Chicago, Ill., under the Act of March 3, 1897. Additional entry at Milwaukee, Wis.

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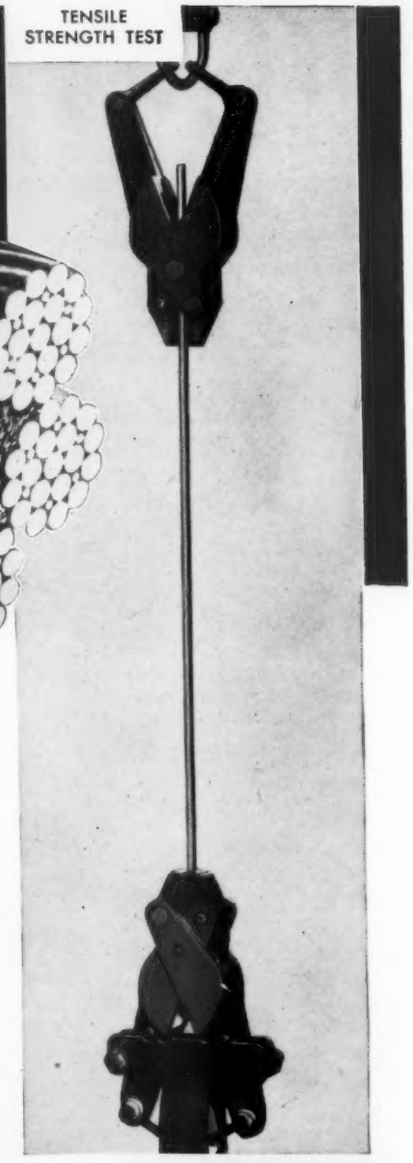


WE TESTED THIS 450 TIMES

To prove its Quality

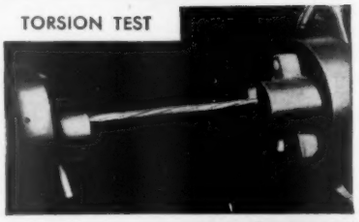
JUST as each part of a well built machine* must be tested individually before it is accepted, so each individual wire in American Tiger Brand Wire Rope is tested at least 3 times, in addition to test for size, before it can pass to the stranding machines.

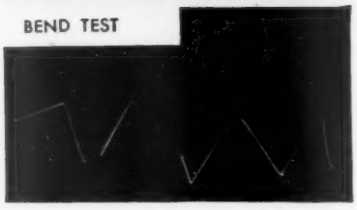
Your work puts wire rope to the severest tests. It must string or reeve easily and quickly . . . spool well . . . avoid whipping at high speeds . . . take the terrific jerks of starting and stopping.

And it is these qualities in American Tiger Brand Wire Rope which have given it a dominant position in the field—qualities which have been built into it by engineers whose wealth of experience is backed by over 100 years of wire making.

American Tiger Brand Wire Rope is available in either Standard (non-preformed) or Excellay (preformed) constructions.

***USS American Tiger Brand Wire Rope is a machine, more depended on than many. It fits the definition "Any combination of mechanism for utilizing or applying power."**





AMERICAN TIGER BRAND WIRE ROPE

American Tiger Brand Wire Rope. Electrical Wires & Cables. Amerclad All-Rubber Cables. Aerial Tramways. Tiger Wire Rope Slings. Tiger Wire Rope Clips.

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York

COLUMBIA STEEL COMPANY
Russ Building, San Francisco

United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

"TY" marches on!

Since 1934 we've sold more and more-and more

TRAYLOR

TYPE "TY" Reduction Crushers

- *Seldom, in our long history of building equipment for the Rock Products Industries, have we achieved the success and won the applause of operators and users as followed the introduction of our Type TY Reduction Crusher.*
- *Literally, we have been, at times, hard put to supply the phenomenal demand for this machine, but we have enlarged our facilities for its manufacture, so we'll be able to supply you promptly during 1938.*
- *"The TY must have a lot on the ball" you say? You're right—it has! How much, you may judge for yourself when you talk to our representative, who'll call whenever you say! But, in the meantime, send for our Bulletin 3012, or pick one up and have a talk, too, at Booth 32-33 at the Cincinnati Convention Expositions in January and February, 1938.*

TRAYLOR ENGINEERING & MANUFACTURING CO.

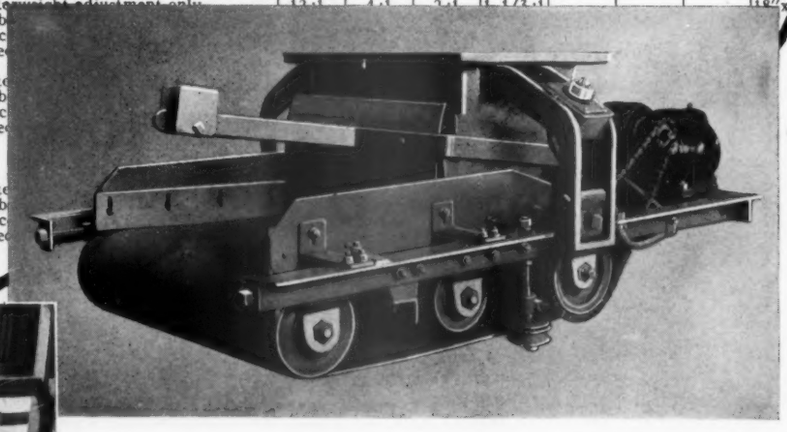
ALLENTOWN, PENNSYLVANIA, U. S. A.

NEW YORK CITY — CHICAGO — SALT LAKE CITY — LOS ANGELES — SEATTLE

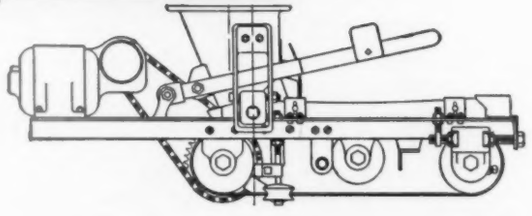
★If Feeding Is Your Problem Here's the Answer!

★ HARDINGE CONSTANT WEIGHT FEEDER CAPACITIES AND SPECIFICATIONS

	Maximum Capacity at 85lbs. per cu. ft. (see note below)	H.P. Motors Required	Method of Regulation of Capacity	Maximum size of feed also capacity range ¼"	1"	2"	4"	8"	12"	18"	Size Feed Hopper	Weight Lbs.
A	2500 lbs. per hr.	1/10 H.P.	Counterweight adjustment only.....	4 :1	2 :1	(capacity variation range)					9"x9"	350
B	12 tons per hr.	¼ H.P.	Counterweight adjustment only.....	6 :1	2 :1	1–1/3 :1					9"x9"	
			Variable speed (belt or motor) only.....	3 :1	3 :1	3 :1						
			Both counterweight and variable speed (belt or motor).....	18 :1	6 :1	4 :1						
C	200 tons per hr.	¼ H.P. below 20 T/hr. ½ HP above 20 T/hr.	Counte...	12 :1	4 :1	3 :1	1 1/3 :1				18"x1	
			Variab...									
			Both c...									
			spee...									
D	1000 tons per hr.	½ H.P. below 15 T/hr. 1 HP 15 to 100 T/hr. 2HP above 100 T/hr.	Counte...									
			Variab...									
			Both c...									
			spee...									
E	2000 tons per hr.	½ H.P. below 5 T/hr. 1 H.P. 5 to 50 T/hr. 2 HP above 50 T/hr.	Counte...									
			Variab...									
			Both c...									
			spee...									
F	200 tons	1 H.P. below 10 T/hr. 2 H.P.	Coun...									



Page torn out of Bulletin 41 Send for it!



THE HARDINGE CONSTANT WEIGHT FEEDER feeds by weight—not volume. You get increased tonnage, or absolute uniformity in the rate of feed, by eliminating the variation caused from change in size of material fed, bulking or bin segregation. It actually increases process capacity 10 to 20%. Two-thirds of our rapidly mounting sales volume is made up of *repeat orders*. Make money with this Feeder. Send for Bulletin 33-C and Bulletin 41.

HARDINGE COMPANY INCORPORATED

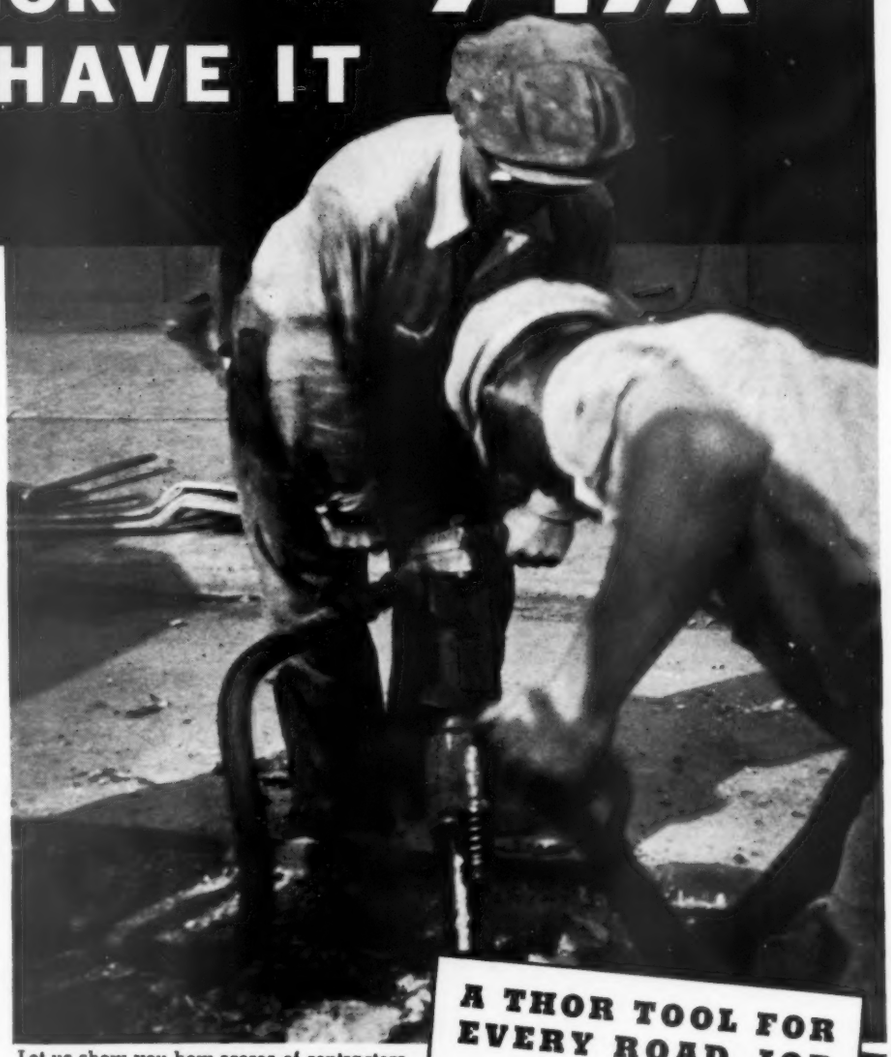
● YORK, PENNSYLVANIA, *Main Office and Works*

NEW YORK, 122 E. 42nd St. CHICAGO, 205 W. Wacker Drive SAN FRANCISCO, 501 Howard St. DENVER, 817 17th St.

SAVE WITH Measured AIR

ONLY THOR TOOLS HAVE IT

EVERY INCH OF POWER FROM EVERY FOOT OF AIR
Thor COCHISE



GREATER PERFORMANCE AT LOWER COST IS OBTAINED IN CONTRACTORS' TOOLS BY NEW PRINCIPLE OF POSITIVE VALVE CONTROL

• **SAVINGS** in air consumption as great as 25% are not uncommon to users of Thor-Cochise contractors' tools. Basic reason for this air economy is the exclusive principle of 'Measured Air' which enables Thor-Cochise tools to utilize effectively ALL of the air that enters the machines.

'Measured Air' affects all the basic factors which control performance. This outstanding development in Thor-Cochise tool construction brings you:

1. **Lower Air Consumption** — A patented short-travel valve, operating with split-second accuracy, admits only the exact amount of air needed for most efficient operation.
2. **Full-Power Performance** — Positive valve action controls operation so that Thor-Cochise tools get "Every Inch of Power . . . From Every Foot of Air."
3. **Ease of Handling** — 'Measured Air' provides synchro-action air cushioning with a full cushion of air at both ends of the piston stroke to prevent shock and vibration.
4. **Lower Maintenance Costs** — With every stroke powered by an unvarying, measured quantity of air, operation is smooth and uniform . . . wear is reduced.

Let us show you how scores of contractors have cut their costs with Thor-Cochise tools. Write for your copy of a booklet called "What is 'Measured Air'?" It gives you all the facts.

• • FIVE • STAR • •
ROAD SHOW and CONVENTION
AMERICAN ROAD BUILDERS ASSOCIATION
BOOTH C-30
CLEVELAND, OHIO
JANUARY 17-21 1938

A THOR TOOL FOR EVERY ROAD JOB

ROCK DRILLS
Made in several types and a wide range of sizes to meet varying requirements for sinking, drifting and stoping.

PAVING BREAKERS
Both valve and valveless types for light, medium or heavy duty demolition and street opening work.

CLAY DIGGERS—TRENCH DIGGERS
Light and heavy duty tools for digging gravel, clay and hardpan . . . for trench digging, shaft sinking and excavation where ground is frozen or unusually stiff.

TOOL MAKERS Thor SINCE 1893

INDEPENDENT PNEUMATIC TOOL CO.
600 WEST JACKSON BLVD., CHICAGO, ILLINOIS
COCHISE ROCK DRILL MFG. CO. (Division) 6200 E. SLAUSON AVE., LOS ANGELES, CALIF.
Birmingham Boston Buffalo Chicago Cleveland Detroit Milwaukee
New York Philadelphia Pittsburgh St. Louis San Francisco Toronto

Entrance to the mine of Champion Sillimanite, Inc., 9,000 feet high on the White Mountains. All of the ore has to be taken out by pack mules.

Champion Sillimanite, Incorporated Uses TIMKEN Rock Bits

Mining sillimanite is one of the toughest jobs ever to be tackled by rock bits. The extreme hardness of the rock—particularly a topaz bearing quartzite—encountered in the mine of Champion Sillimanite, Inc., provides one of the severest tests of drilling capacity and endurance any rock bit has ever had to face.

Despite these adverse conditions, Champion Sillimanite has found TIMKEN Bits very satisfactory as regards both efficiency and economy—and so have many other prominent mine operators.

When the going is hardest TIMKEN Bits best show the stuff they are made of—TIMKEN Electric Furnace Steel. They stand up where ordinary bits would quickly fail. The shoulder construction enables them to take the terrific pounding of the drills without danger to the threads. You'll find TIMKEN Bits important factors of increased production and lower costs wherever they are used.

Don't miss the
TIMKEN ROCK BIT EXHIBIT
at the
Road Show

SPACE D-5

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; Timken Rock Bits; and Timken Fuel Injection Equipment.

TIMKEN
ROCK BITS

It took 1,700,000 TONS OF GRAVEL to wear it out

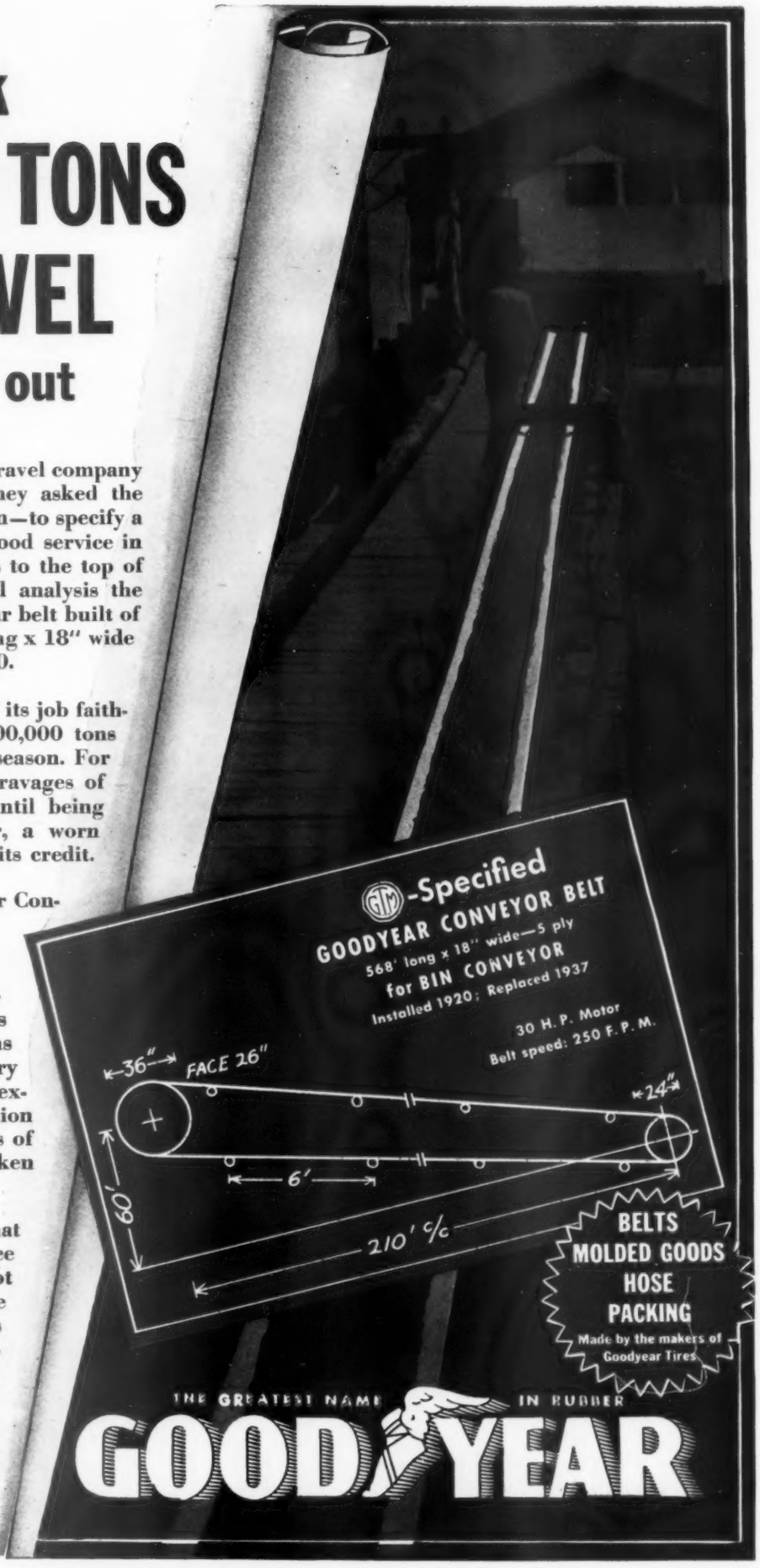
WHEN a large Ohio sand and gravel company built their plant in 1920 they asked the G.T.M.—Goodyear Technical Man—to specify a conveyor belt that would give good service in hauling gravel from the screens to the top of the 60 foot bins. After careful analysis the G.T.M. recommended a Goodyear belt built of five plies of 28 oz. duck, 568′ long x 18″ wide which was installed in April 1920.

For seventeen years this belt did its job faithfully, carrying approximately 100,000 tons of gravel up to the bins each season. For seventeen years it resisted the ravages of sun, rain, frost and abrasion until being honorably retired last summer, a worn veteran with 1,700,000 tons to its credit.

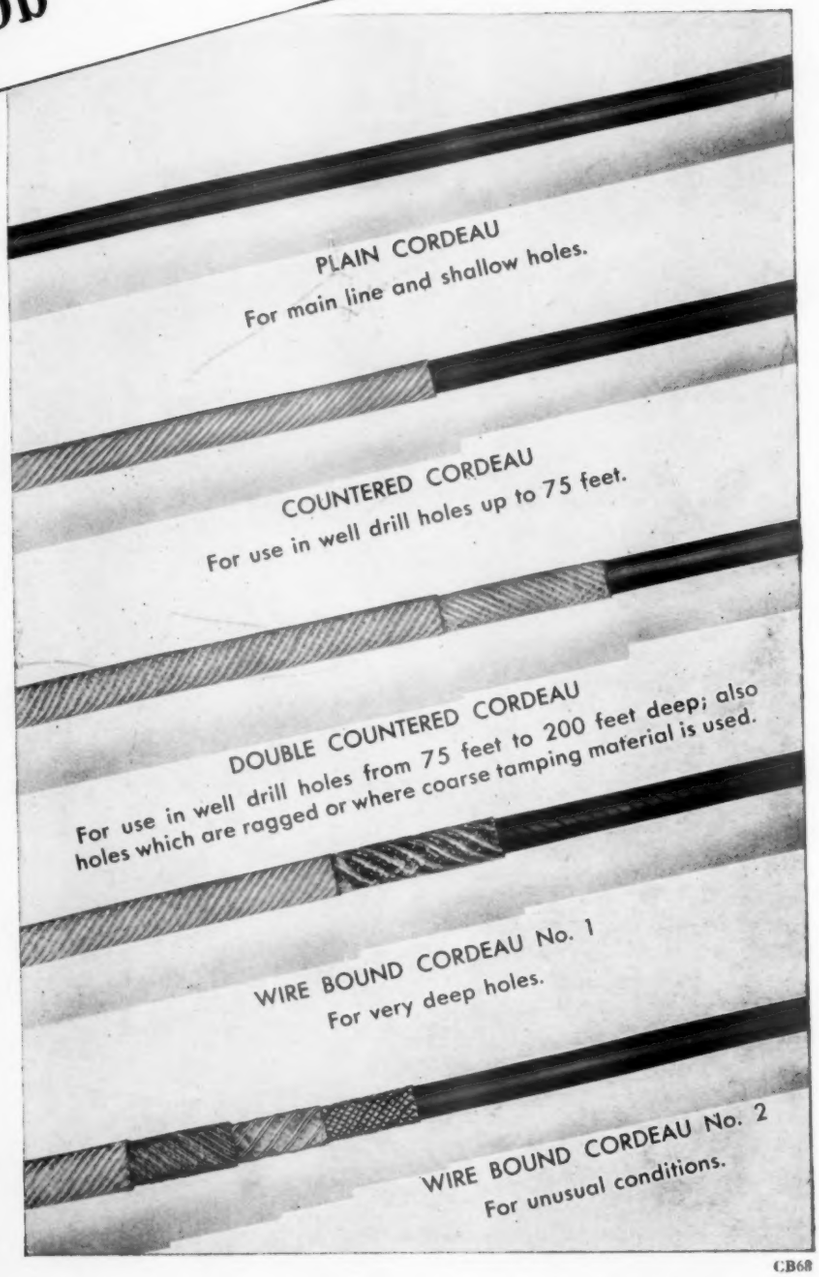
It is not by chance that Goodyear Conveyor Belts pile up so many records like this. Every Goodyear installation is specially built for its job with full consideration of all the many factors that affect conveyor belt life as reported by the G.T.M. Every Goodyear Belt is built with an exclusive mildew-inhibiting friction that resists the cancerous attacks of damp-rot that so quickly weaken many belts.

If you need a conveyor belt that will give you many years' service at lowest cost per ton, why not consult the G.T.M.? Just write Goodyear, Akron, Ohio, or Los Angeles, California—or the nearest Goodyear Mechanical Rubber Goods Distributor.

MORE TONS ARE HAULED ON GOODYEAR CONVEYOR BELTS THAN ON ANY OTHER KIND



Use the *right* CORDEAU for the job . . . . .

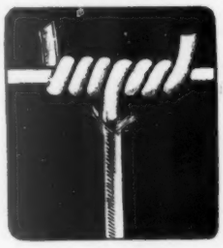

PLAIN CORDEAU
For main line and shallow holes.
COUNTERED CORDEAU
For use in well drill holes up to 75 feet.
DOUBLE COUNTERED CORDEAU
For use in well drill holes from 75 feet to 200 feet deep; also holes which are ragged or where coarse tamping material is used.
WIRE BOUND CORDEAU No. 1
For very deep holes.
WIRE BOUND CORDEAU No. 2
For unusual conditions.

CB68

EASY as choosing a collar button . . . yet the *right* type of Cordeau is *double* insurance of success in many blasting operations.

Cordeau-Bickford is an insensitive detonating fuse. It acts as the detonating agent for all cartridges in each hole, and it connects all holes. A single cap and fuse or electric blasting cap, applied to the proper main line of Cordeau above ground, detonates the entire blast.

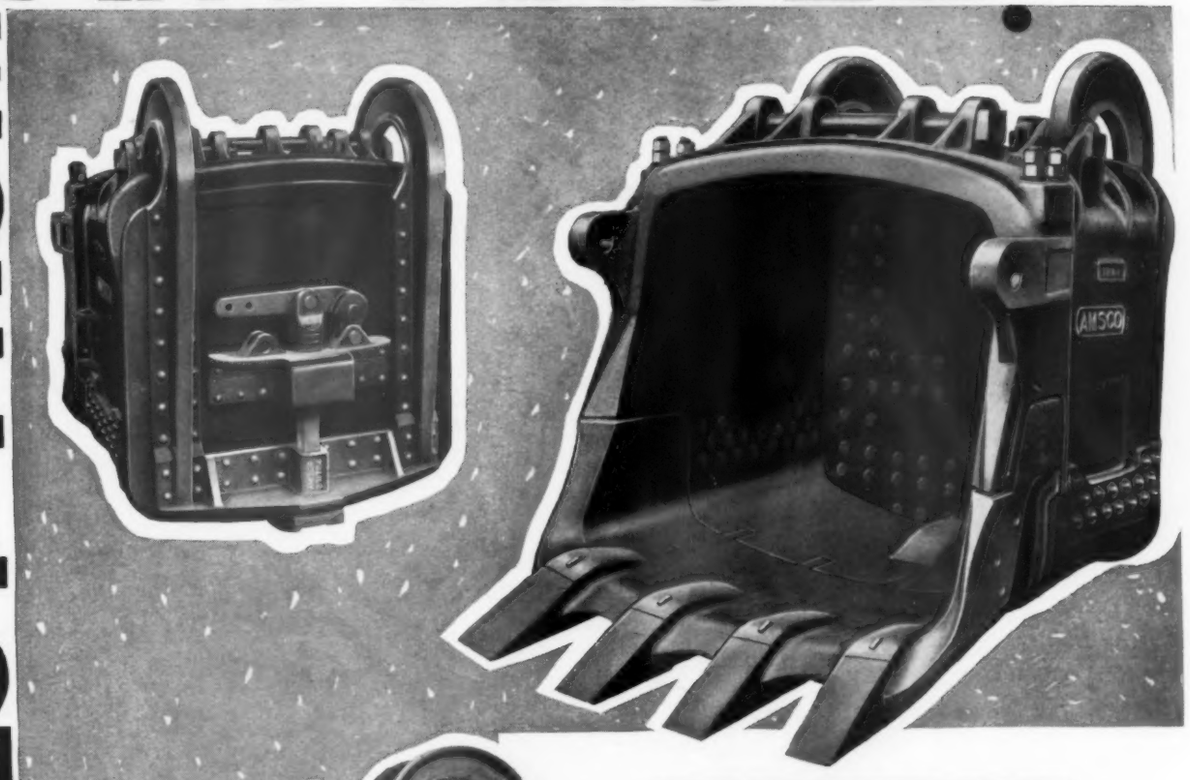
At the right are shown five standard types of Cordeau-Bickford Detonating Fuse. Send for a copy of the Cordeau Book.

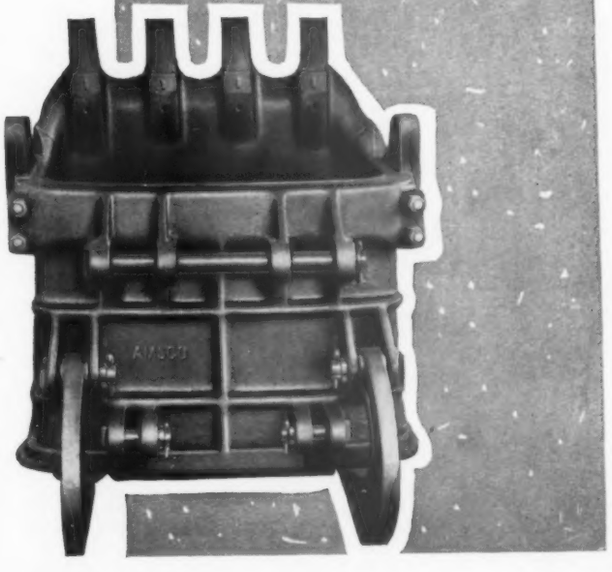


THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONN.

CORDEAU·BICKFORD *Detonating Fuse*

BEST FROM ANY ANGLE!





AMSCO

TRADE MARK REGISTERED

RENEWABLE LIP DIPPERS

Design, construction, performance or maintenance — considered from any angle AMSCO Renewable Lip Dippers are best!

The rugged two-piece body has ample reinforcements to resist digging pressure. Riveted front can be readily replaced when worn. Lips have sharp cutting edges, are easily renewed or interchanged by loosening two "U" bolts, and are made in various types for digging different classes of materials. Tooth buses are cast integral with the lip. Teeth are tapered for most efficient digging and are available in many styles. Hair-trigger latch holds securely and releases quickly. They dig fast and dump quick and clean, because of smooth body interior. Made of AMSCO Manganese Steel throughout, they naturally resist impact and abrasion and minimize maintenance.

Made to fit any type dipper stick, AMSCO Renewable Lip Dippers are available in sizes from 3/4 yd. to 18 yds., and without renewable lips in 3/8, 1/2 and 5/8 yd. sizes.

On your new shovel or in re-equipping your old shovel, be sure to have an AMSCO Renewable Lip Dipper on the stick for 100% diggability.

See for yourself why AMSCO Dippers are best — Booth D-21 at the Road Show!

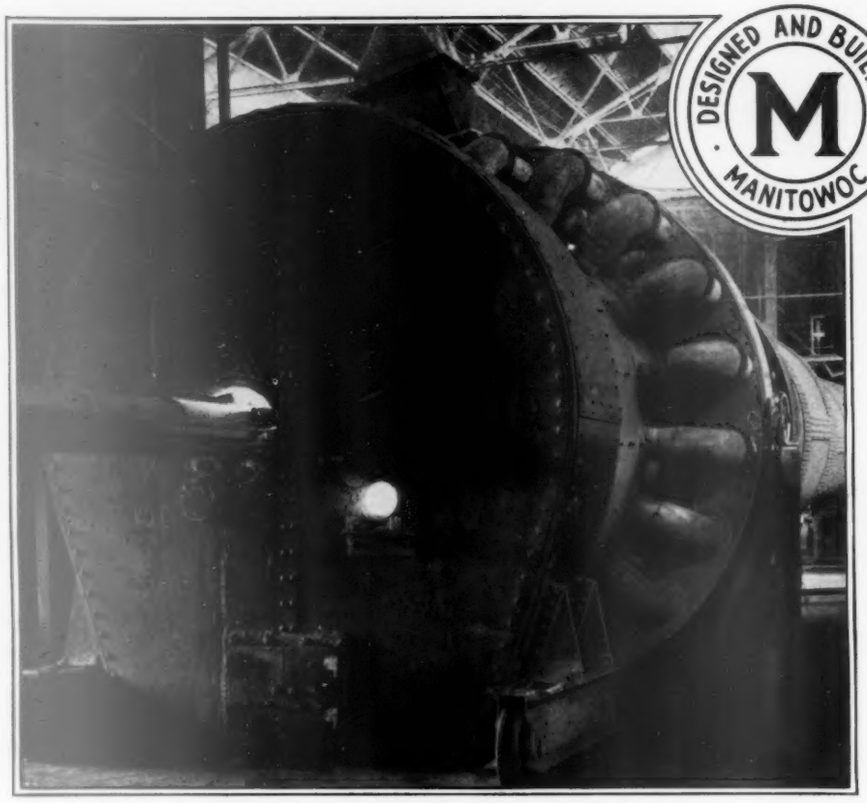
AMERICAN MANGANESE STEEL DIVISION

of The American Brake Shoe & Foundry Company

396 E. 14th Street, Chicago Heights, Ill.

Foundries at Chicago Heights, Ill.; New Castle, Del.; Denver, Colo.; Oakland, Calif.; Los Angeles, Calif.; St. Louis, Mo.
Offices in Principal Cities

The VANDERWERP RECUPERATOR



10-Ft. Cement Kiln Installation of Vanderwerp Recuperator

for Rotary Kilns

THE VANDERWERP RECUPERATOR is the simplest and most efficient means of accomplishing the initial cooling of the clinker, with maximum heat recovery and full benefits in quality due to rapid air quenching.

The installation requires no alterations to existing structures, firing-hoods, or auxiliary equipment; excavations and foundations are unnecessary.

Space limitations in the kiln room in no case preclude the installation of Recuperators.

The Recuperator is now accepted as the one and only air-quenching type of cooler offering adequate protection against excessive expansion in high-magnesia cements. It insures:

- Improved Quality of Cement
- Better Grindability of Clinker
- Maximum Fuel Economy
- Highest Efficiency of Heat Recovery
- Low Maintenance Cost

Kiln operators interested in obtaining the maximum benefits from air quenching and heat recovery—with proven equipment—are requested to write, without obligation, for full particulars.

MANITOWOC ENGINEERING WORKS

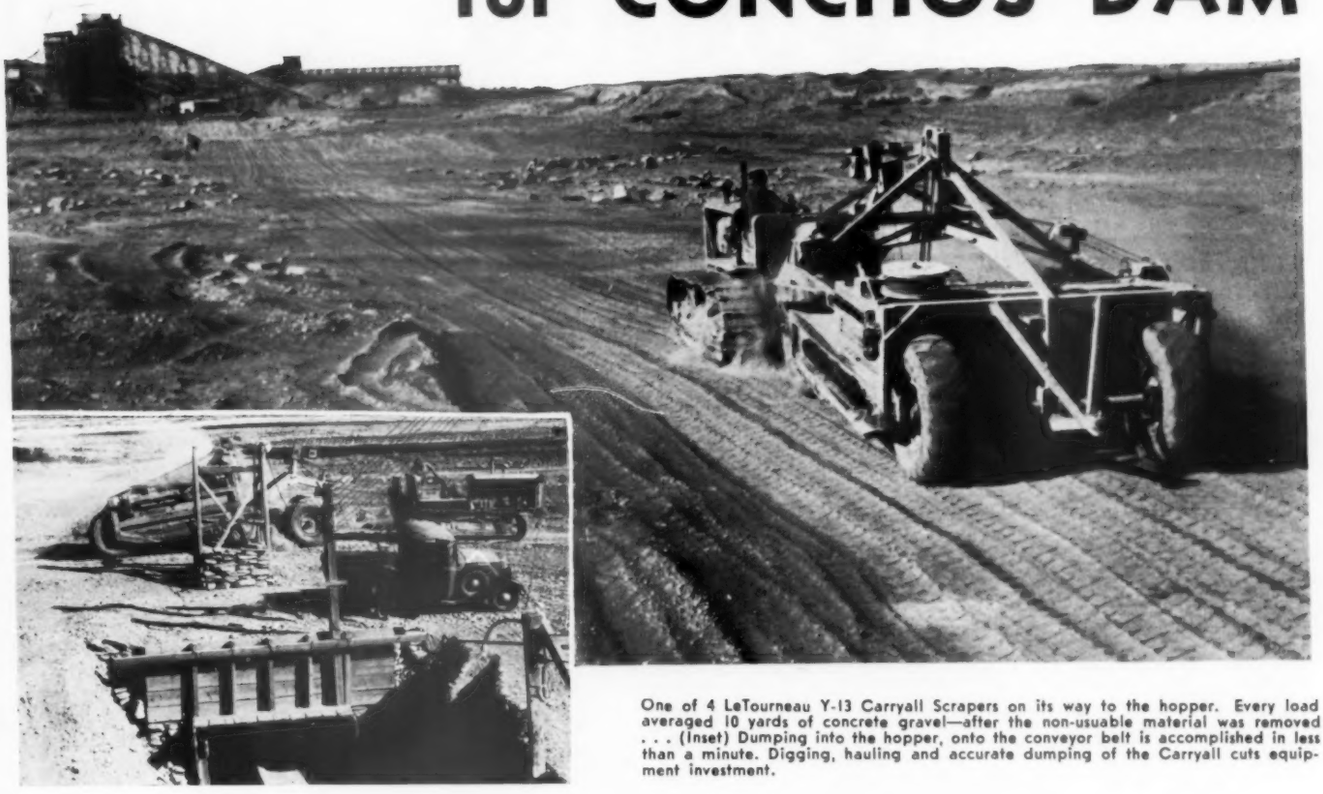
Division of

Manitowoc Ship Building Company

GENERAL OFFICES AND PLANT
Manitowoc, Wisconsin

CHICAGO OFFICE
131 E. River St.

CARRYALLS FURNISH LOW-COST GRAVEL for CONCHOS DAM



One of 4 LeTourneau Y-13 Carryall Scrapers on its way to the hopper. Every load averaged 10 yards of concrete gravel—after the non-usuable material was removed . . . (Inset) Dumping into the hopper, onto the conveyor belt is accomplished in less than a minute. Digging, hauling and accurate dumping of the Carryall cuts equipment investment.

Conchos Dam contractors, Bent Brothers, Inc. and Griffith Company, are moving 1,200,000 cubic yards of material to furnish gravel for all concrete going into the project. Their long experience has taught them how to do it cheaply and profitably.

Four LeTourneau Y-13 Carryall Scrapers were assigned the job; removed 300,000 cubic yards of overburden as a starter. Now, working in a figure 8 fashion over an 8,600 ft. round trip haul, these Carryalls make a complete cycle every 20.06 minutes—dump 2 loads averaging 10 yards each of washed sand and gravel into the screening plant conveyor hopper; or average 60 yards per Scraper of pay material every hour.**

ACTUAL JOB DATA

**The data contained in this advertisement was gathered and its accuracy certified by our Field Engineering Department, whose members visit the major earthmoving projects of the country, and learn the latest and best of current stripping practices. We invite you to call for aid in estimating and planning materials-moving problems.

A LeTourneau Heavy Duty Rooter is on the job to loosen tight or cemented gravel for fast Carryall loading—saves costly blasting. To complete this cheaper method of gravel excavation, a LeTourneau Angledozer is used as a general utility tool. Thus, on this job, as on hundreds of stripping jobs the country over, LeTourneau equipment has again proved it digs, hauls and delivers more yardages quicker, cheaper and with smaller equipment investment than other methods offer.

Government Forces use LeTOURNEAU, too! An order has just been placed by the U. S. Engineers Department for 4 LeTourneau Angledozers to help bring Conchos Dam work to a low-cost conclusion.

See your "Caterpillar" tractor dealer . . . he can show you how LeTourneau low-cost operation will help you make new profits from seemingly "impossible" materials-handling jobs.

R. G. LeTOURNEAU, INC.

PEORIA, ILLINOIS STOCKTON, CALIFORNIA

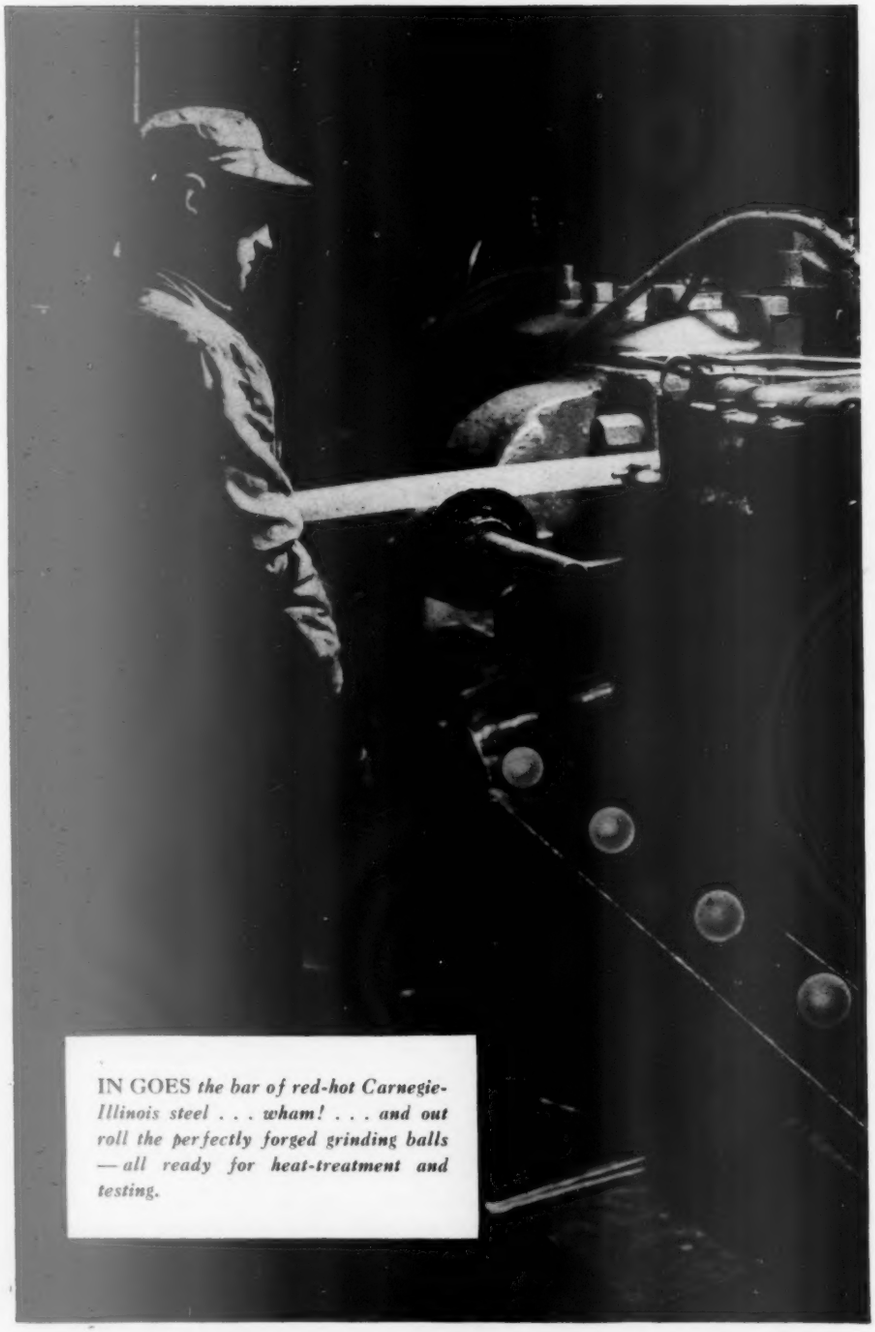
Cable Address: "Bobletorno"

Manufacturers of: Angledozers*, Buggies*, Bulldozers, Carryall* Scrapers, Cranes, Drag Scrapers, Power Control Units, Rooters*, Treedozers.

* Name registered in U. S. Patent Office.

LETOURNEAU

MADE TO STAND THE TOUGHEST GRIND



IN GOES *the bar of red-hot Carnegie-Illinois steel . . . wham! . . . and out roll the perfectly forged grinding balls — all ready for heat-treatment and testing.*

BEFORE USS Lorain Grinding Balls leave our plant we know that they are ready to give uniform service in the "daily grind" of your mills. This assurance is based on more than quality of materials, workmanship and processes. We plus that with careful forging and a precise system of heat control which results in just the right degree of hardness to withstand the heavy abrasion and terrific pounding of cascade action.

To maintain this standard, USS Lorain Grinding Balls are subjected to routine laboratory tests. From each production, sample grinding balls are given the Brinell test to make certain of surface hardness, and the Rockwell test to check hardness through the diameter of the ball. In this way we make sure that the gradation of hardness from the surface to the center is correct for maximum resiliency and wear.

USS Lorain Grinding Balls are made uniformly to meet your grinding needs. They are available in the following sizes: ½", ⅝", ¾", ⅞", 1", 1¼", 1½", 2", 2½", 3", 3½", 4", 4½" and 5".

OTHER LORAIN PRODUCTS

Mill Liners and Screens of High Carbon Rolled Plate, Manganese, Chrome Nickel, Chrome Nickel Molybdenum, and plain Carbon Steel or Hard Iron; Hammers for Swing Hammer Mills, Industrial Cars, and Trackwork.

U·S·S LORAIN GRINDING BALLS

CARNEGIE-ILLINOIS STEEL CORPORATION

Lorain Division *Johnstown, Pa.*

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*

United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

A HAND THAT CAN'T BE BEAT !

Marion stakes its reputation on the qualifications of its intermediate-size shovels to deliver top yardage at the lowest unit operating cost. This is not a difficult promise . . . for they are doing it right now in many of the foremost open-pit mines and quarries in the country. Only a Marion will give you endorsed Marion performance. » »

MARION INTERMEDIATE SIZE EXCAVATORS

4101 4161
4121 5161

There is a Marion of the right size and capacity to master every material handling job. Write for bulletin.

MARION for every MATERIAL HANDLING JOB TO ASSURE HIGH OUTPUT AND LOW MAINTENANCE

The MARION

STEAM SHOVEL COMPANY • MARION, OHIO

IMPACT

ABSORBED BY CUSHION EFFECT of REPUBLIC CONVEYOR BELTS

★ Impact of sharp, heavy materials is one of the most destructive forces met in conveyor belt operation. It tends to cut and puncture a belt rather than wear it out gradually.

To overcome this effect, Republic Engineers have developed a construction in which standard belt duck is impregnated with a springy, elastic rubber compound and surrounded by a tough, resilient rubber cover that cushions impact and resists the gouging, cutting action of sharp, abrasive stone. When the cover is kept intact, grit and moisture are prevented from working into the fabric. Thus the chief causes of conveyor belt failure are removed and long, economical service assured.

Republic has been a leader in conveyor belt construction for many years—building belts to meet difficult conditions. And the fact that so many Republic Belts are used in mines and quarries is a proof of correct design. Write for our new colorful folder giving complete information on conveyor and elevator belts.

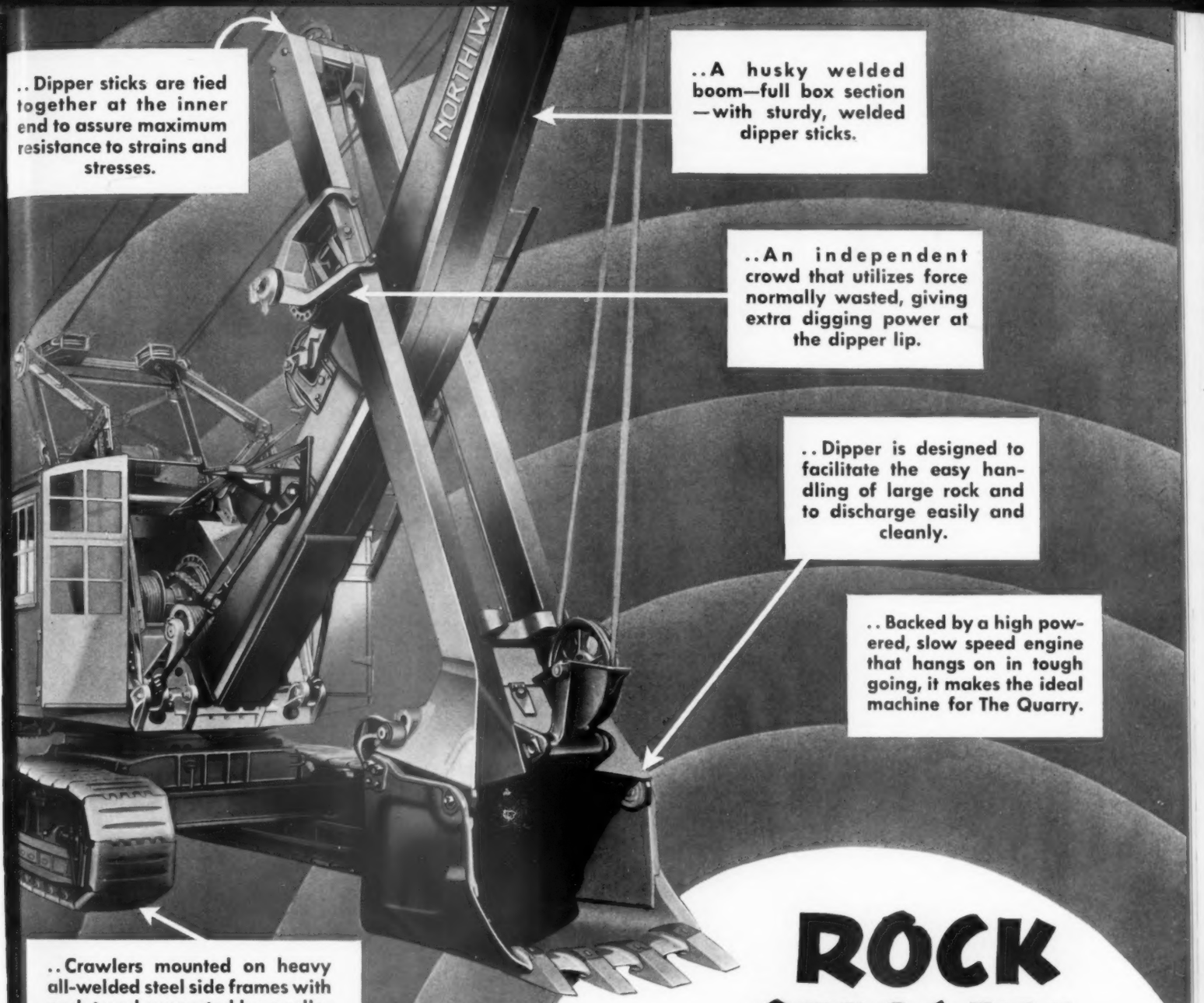
REPUBLIC RUBBER

Division OF LEE RUBBER AND TIRE CORPORATION

YOUNGSTOWN, OHIO

Manufacturers of HOSE
BELTING • PACKING
MOLDED PRODUCTS

ORDER REPUBLIC RUBBER PRODUCTS FROM YOUR DISTRIBUTOR



..Dipper sticks are tied together at the inner end to assure maximum resistance to strains and stresses.

..A husky welded boom—full box section—with sturdy, welded dipper sticks.

..An independent crowd that utilizes force normally wasted, giving extra digging power at the dipper lip.

..Dipper is designed to facilitate the easy handling of large rock and to discharge easily and cleanly.

..Backed by a high powered, slow speed engine that hangs on in tough going, it makes the ideal machine for The Quarry.

..Crawlers mounted on heavy all-welded steel side frames with each tread supported by a roller—no chance of treads buckling up between rollers—no open spaces between treads to pick up stones or trash.

GASOLINE • ELECTRIC • DIESEL • OIL

Built in a range of 18 SIZES 3/8 yd. capacity and Larger

ROCK SHOVEL *Advantages*

that make NORTHWEST ideal for The Quarry

NORTHWEST ENGINEERING CO., 1807 Steger Bldg., 28 E. Jackson Blvd., Chicago, Ill.

NORTHWEST

Look at the record!

50 H. P. PRODUCES 60 TONS PER HOUR

TOUGH TRAP ROCK

Reduced From 7" to 3/8"

With KENNEDY No. 37-S Gearless Crusher

EQUIPPED WITH BUILT-IN KENNEDY SYNCHRONOUS MOTOR

Performance That Pays Dividends

SOMERSET CRUSHING COMPANY
CRUSHED STONE - ROAD BINDER
BERNARDSVILLE, N. J.

Dear Sir:

We have your letter of the 6th inst. asking information about 37-S Kennedy Crusher.

The writer was very skeptical about this machine at first because of its departure in construction from other standard makes. The Woodhouse is the nearest thing to it with the motor on top instead of at the bottom.

We have not checked the power consumed accurately but know that 50 H.P. Motor handles the load easily and that you can not pile in stone enough to slow it down. We dump a truckload of 8 tons right in the hopper and it eats it right up. It has given us perfect service.

The product is cubical. Whether or not it is due to the crusher, we can not say, but we do know that road men here prefer our stone. It will take stone at 7" and reduce it to 3/8" at the rate of 60 tons per hour. It has been in operation over two years and does not show excessive wear in any part. It has given us perfect satisfaction and we shall be pleased to show you everything any day you choose to visit our plant.

If you contemplate purchasing a Gyratory, you should come up and see it operate and hear what our superintendent has to say about it.

Very truly yours,
SOMERSET CRUSHING COMPANY,
By, [signature]

HWH:A

Modernize With Kennedy Products

See Us At The National Crushed Stone Convention—Cincinnati—Booth No. 11.

Complete Line of Jaw and Gyratory Crushers, Screens, Elevators, Conveyors, Ball, Rod & Tube Mills, Dryers, Kilns, Coolers, Pulverized Coal Firing System, Steam Boilers,, Pneumatic Transport System, Washers, Classifiers, Feeders, Cyclones, Air Filters, Etc.

Ask For One of Our Engineers to Call

KENNEDY-VAN SAUN

MFG. & ENG. CORPORATION

TWO PARK AVENUE NEW YORK, N. Y.

LUDLOW-SAYLOR, St. Louis:
Send the following Bulletins:

Firm

Street

City

State

REVISED LIST PRICES
"The Perfect"
STEEL AND SUPER-LOY WOVEN WIRE SCREENS

REVISED LIST PRICES
"The Perfect"
BRASS, BRONZE AND COPPER WOVEN WIRE SCREENS
II

Revised List Prices
"The Perfect"
STEEL WIRE CLOTH

Revised List Prices
"The Perfect"
BRASS, BRONZE AND COPPER WIRE CLOTH
V

Revised List Prices
"The Perfect"
Monel Metal, Nickel and Stainless Steel WIRE CLOTH
VI

LUDLOW-SAYL
WIRE CO. ST. L

March 1, 1937

GIVE YOURSELF A "Perfect" START

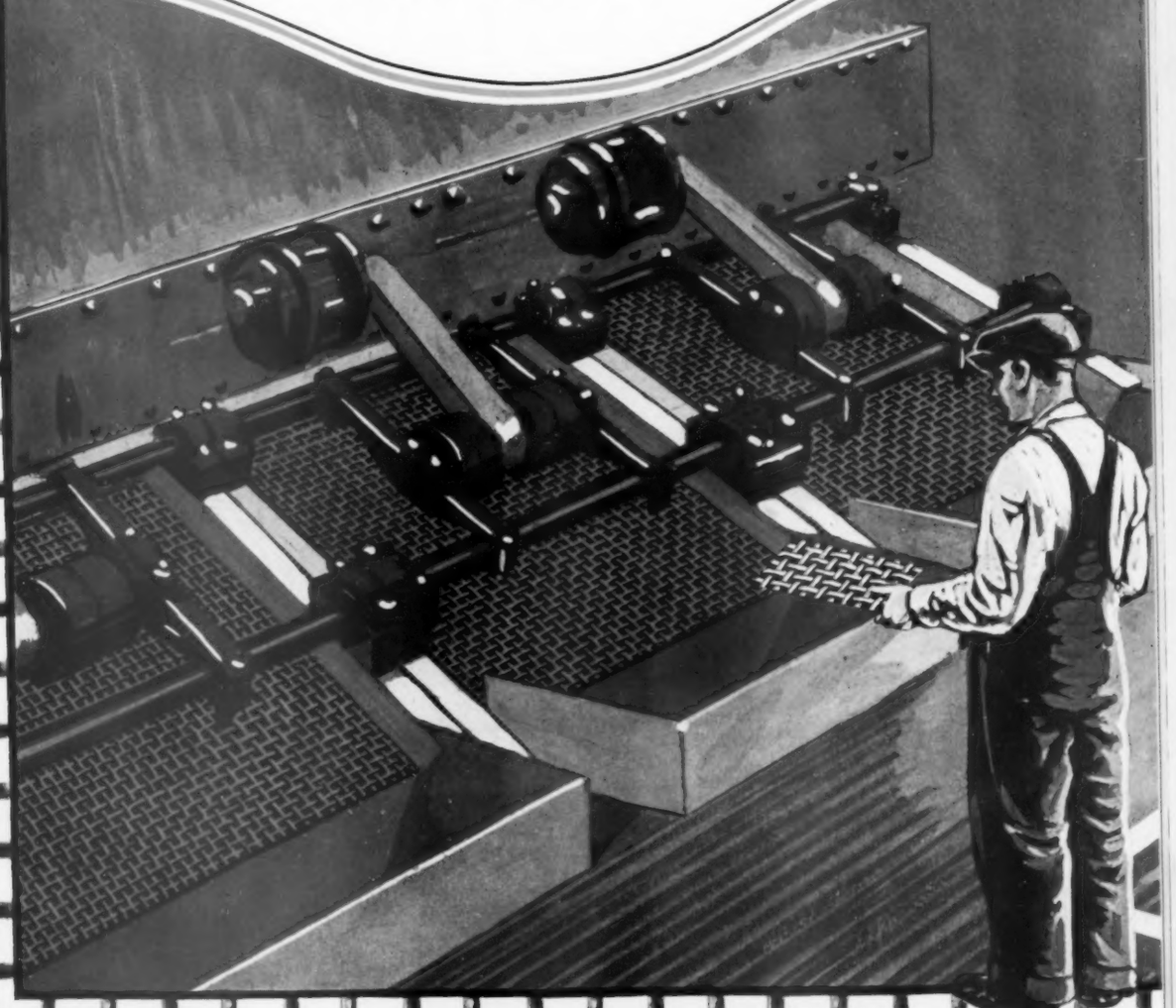
toward a prosperous New Year

Study our samples of "Perfect" wire cloths and screens, and carefully check their qualities and prices.

Our tremendous stocks permit immediate shipments of several thousand weights and widths and weaves, in all standard metals and alloys—plain steel, galvanized steel, stainless steel, brass, bronze, copper, aluminum, etc.; any special requirements are quickly made up to order.

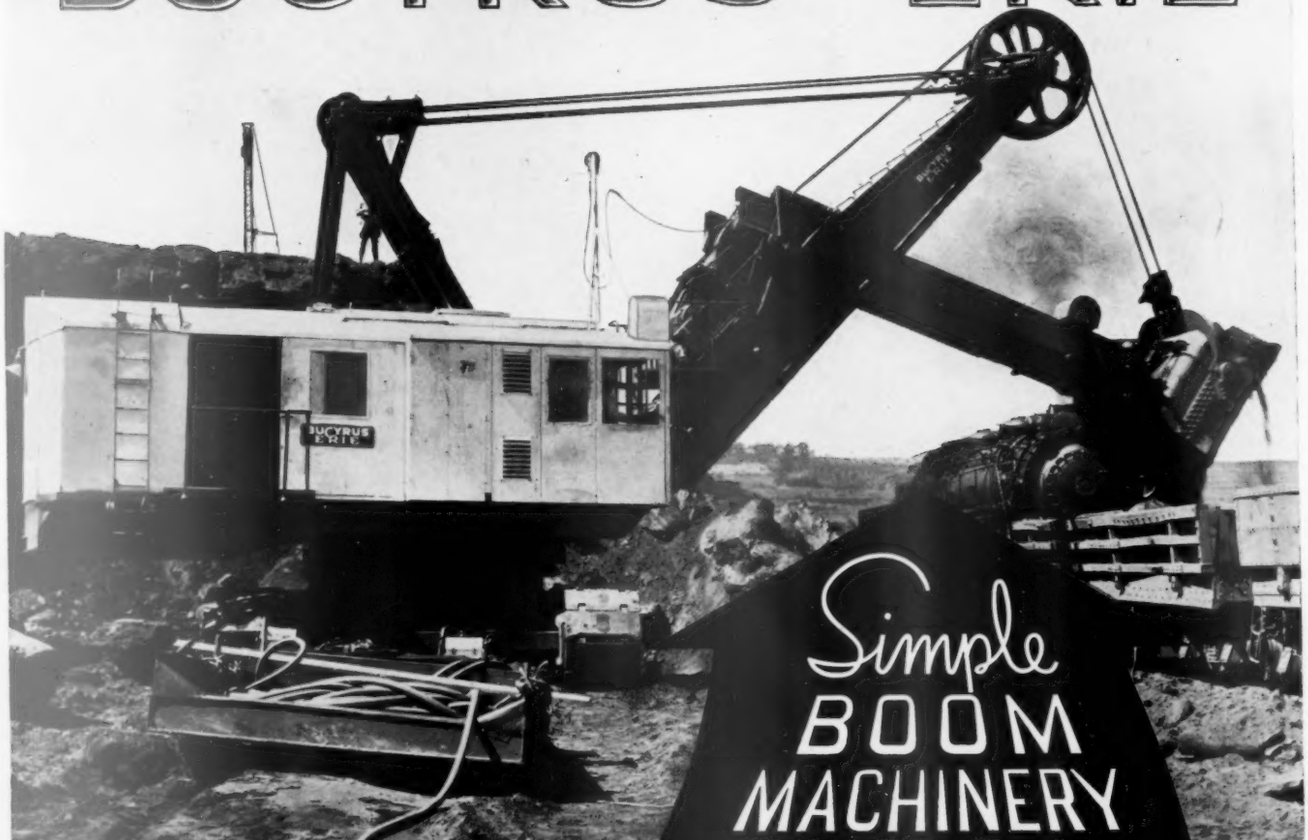
Inquiries for prices are answered fully and promptly, and every order receives immediate careful attention.

Send us your specifications.



The LUDLOW-SAYLOR WIRE COMPANY ST. LOUIS

BUCYRUS-ERIE



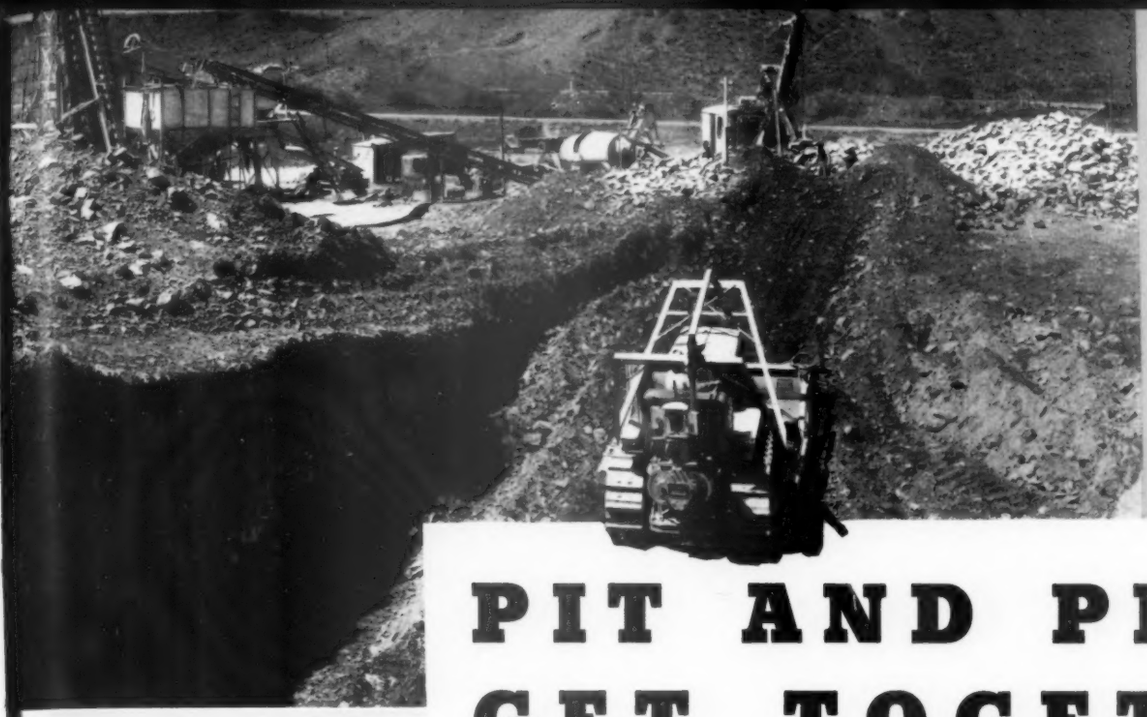
Simple BOOM MACHINERY

The boom-machinery on Bucyrus-Erie's famous 120-B presents an unusual combination of simplicity, strength, smooth-flowing power and light weight. There are only four gears from the motor to the shipper-shaft which is held in large bearings, an integral part of the boom. The motor drives the shipper-shaft through two gear reductions, the intermediate shaft of which is mounted in anti-friction bearings with all gears completely enclosed and running in oil. The motor has on its shaft an automatic solenoid brake, spring set and power released, which serves to hold the machinery when the power is shut off. A safety clutch protects the machinery against shock. The new 120-B bulletin will give you the full story on this modern, big-output quarry and mining shovel.

BUCYRUS ERIE

BUCYRUS-ERIE CO. • SOUTH MILWAUKEE, WISCONSIN, U. S. A.
EXCAVATING, DRILLING AND MATERIAL HANDLING EQUIPMENT

622



"CATERPILLAR" DIESEL TRACTOR
with LeTourneau bulldozer shoving rock from pit to crusher. Works 20 hrs. a day and uses only 1½ to 2 gallons of low-cost fuel per hour.

PIT AND PLANT GET TOGETHER

WITH "CATERPILLAR" DIESELS

"CATERPILLAR" DIESEL ENGINE
of 125 horsepower driving a Cedar Rapids crusher on 2½ gallons of fuel per hour. Capacity, 500 tons of fine gravel per 16 hours.

BRINGING plant to pit or pit to plant — it's all the same to "Caterpillar" Diesel power. Olaf Nelson makes use of its versatility and economy on this crushing-and-screening work near Logan, Utah. Bulldozing is a "dirt-cheap" short-haul method of moving material to the plant — or from one operation to another.

And, of course, when it comes to operating crushers, there's nothing to compare with Diesel power as perfected by "Caterpillar." The power unit shown above is saving Mr. Nelson approximately *one-half* his former power-cost.

Altogether, Mr. Nelson owns thirteen "Caterpillar" units — comprising engines, tractors and Auto Patrols. Repeat orders are the most convincing proof of "Caterpillar" Diesels' quality. For facts-and-figures on *your* particular requirements, call in your nearest "Caterpillar" dealer — or, write us direct.

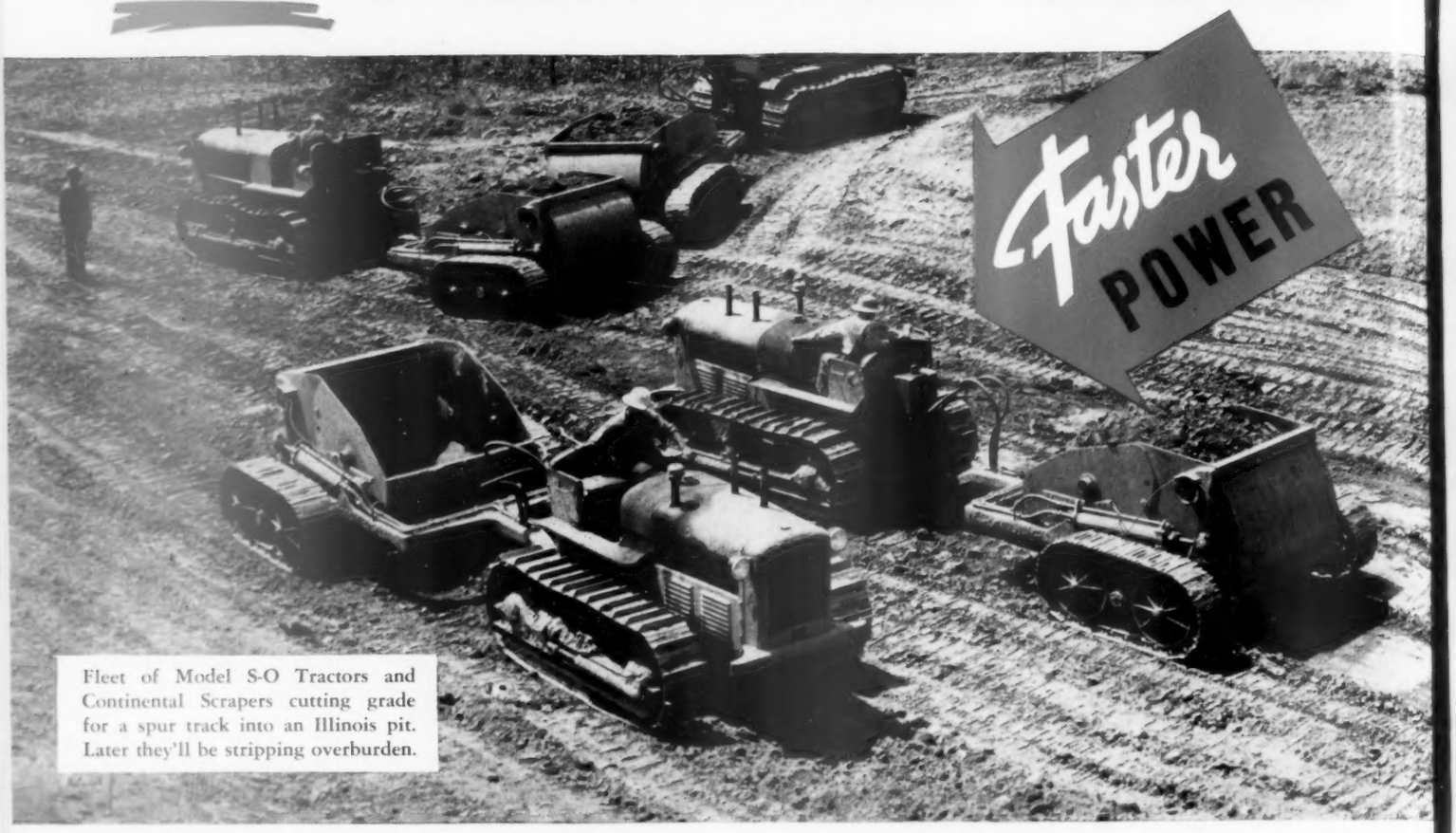
CATERPILLAR TRACTOR CO., PEORIA, ILL.

CATERPILLAR DIESEL POWER

REG. U.S. PAT. OFF.

DIESEL ENGINES • TRACK-TYPE TRACTORS • ROAD MACHINERY

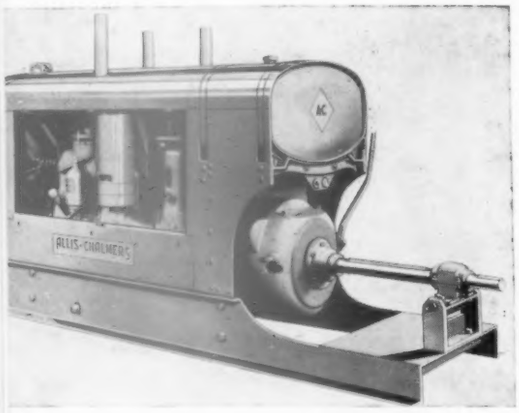
CUT STRIPPING COSTS



Fleet of Model S-O Tractors and Continental Scrapers cutting grade for a spur track into an Illinois pit. Later they'll be stripping overburden.

WITH ALLIS-CHALMERS TRACTORS AND CONTINENTAL SCRAPERS

. . . by digging overburden faster, by hauling it faster and dumping it faster. You can do it with this combination because A-C tractors start instantly and go right to work — no fussing with or waiting on auxiliary motors . . . because Continental's correct digging angle picks up heaping loads in a hurry, gets rid of those loads by end dumping . . . because A-C tractors have more and higher speeds — that means greater flexibility and the right speed for every task . . . because A-C tractor design eliminates speed-robbing deadweight — extra payload is gained by saving tractor weight . . . finally, because there's ample reserve power for lugging in tough going at low speeds, plus FASTER POWER in the higher speeds at which you do 90% of your work. It's this Faster Power which enables A-C tractors to climb steep grades faster, to maneuver easily and quickly in the pit, to strip overburden in a hurry, to cut the cost not only of stripping but of such other extra jobs as building truck roads, grading for spur tracks, materials handling, etc. Ask your nearest A-C tractor dealer to show you how FASTER POWER can help you.



A-C POWER UNITS Dependable, heavy-duty engines, job-proved in tractor service, for operating conveyor systems, separators, crushers, dredges, pumps and other mine machinery. Made in 4 sizes from 31 to 102 H.P. Write for descriptive booklet.

ALLIS-CHALMERS

TRACTOR DIVISION—MILWAUKEE, U. S. A.

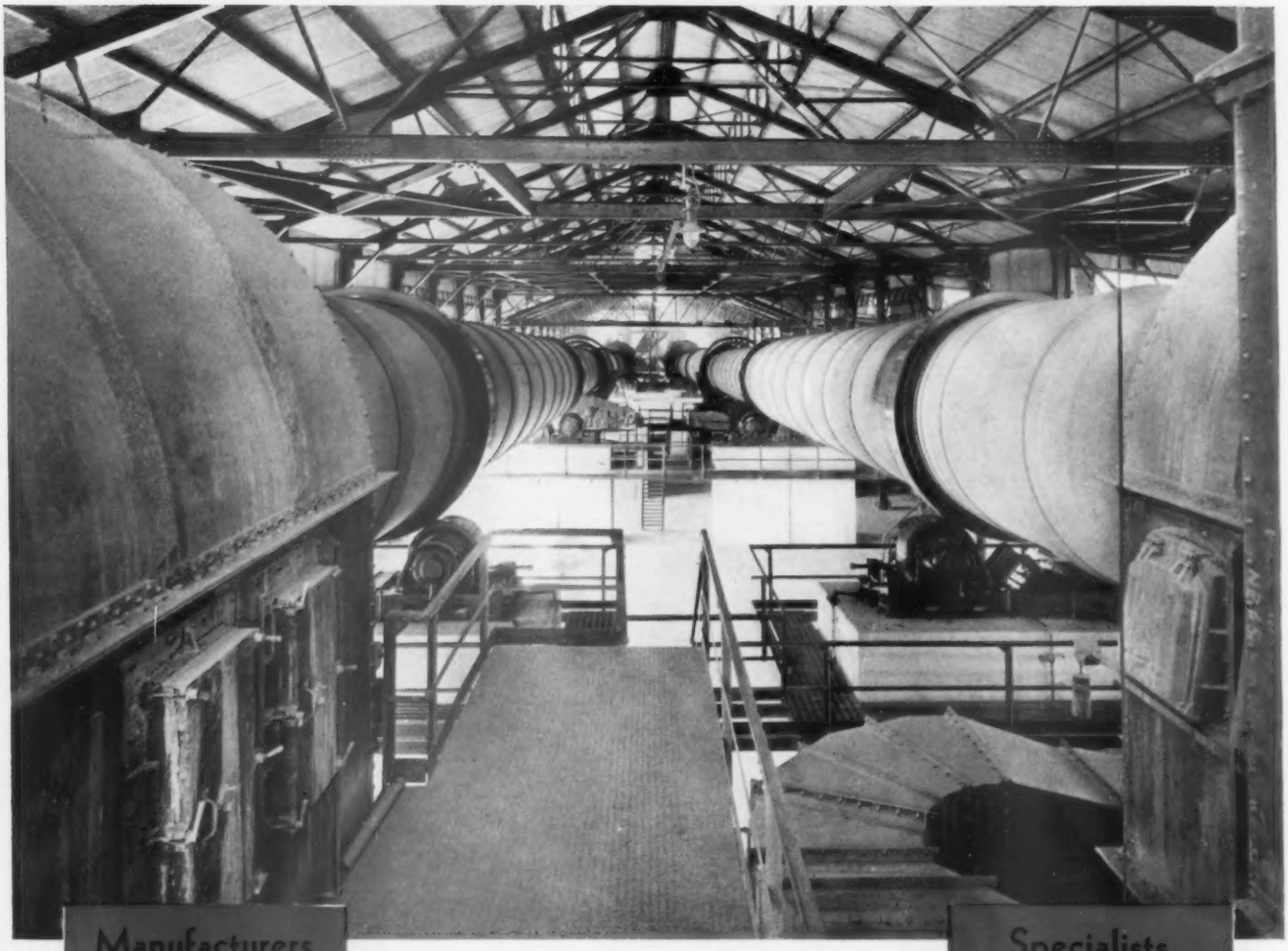
Controlled Ignition

OIL TRACTORS

MODERNIZE TO ECONOMIZE

Lower the cost of Production, Improve the Quality of Product, by Utilizing Modern

CEMENT MAKING MACHINERY
CEMENT PLANT ENGINEERING



Manufacturers of a complete Line of Modern CEMENT MAKING MACHINERY

F. L. SMIDTH & CO.
225 BROADWAY, NEW YORK

Specialists in Engineering of Modern CEMENT MAKING FACTORIES

It's Ready!

YOUR COPY OF THE NEW CINCINNATI CATALOG OF INDUSTRIAL RUBBER GOODS IS READY

It took two years to make this catalog the way we wanted it . . . to get into it the information and industrial rubber products that we know will be valuable to you. It will help you make every dollar you spend for industrial rubber goods do a bigger job. Send for your copy today. Use the coupon below. No cost or obligation.

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Send me, without cost or obligation, a copy of the new Cincinnati Rubber Catalog.

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CINCINNATI

CONVEYOR - ELEVATOR - TRANSMISSION BELTING . . HOSE

an Old Firm ~ ~

· · a New Name

Because of the narrow limitations, the name has been changed.

"Pioneer Gravel Equipment Manufacturing Company"

NOW BECOMES

PIONEER ENGINEERING WORKS, Inc.

which is broader and better describes the present character of our business.

Originally Pioneer was organized to design manufacture, and distribute equipment for the gravel industry . . . equipment used mainly for the preparing of road surfacing materials.

Every year the line has been improved . . . new items added . . . and new fields served. Today, Pioneer products are used extensively in the quarry and mining industries, and for crushing, screening, processing and handling all types of rock, gravel, aggregates, and ore.

There is no change in the organization, the corporation or the personnel. The change is in name only, to better signify the broader field now covered.

PIONEER

PIONEER ENGINEERING WORKS

Inc.

1515 CENTRAL · MINNEAPOLIS, MINN.

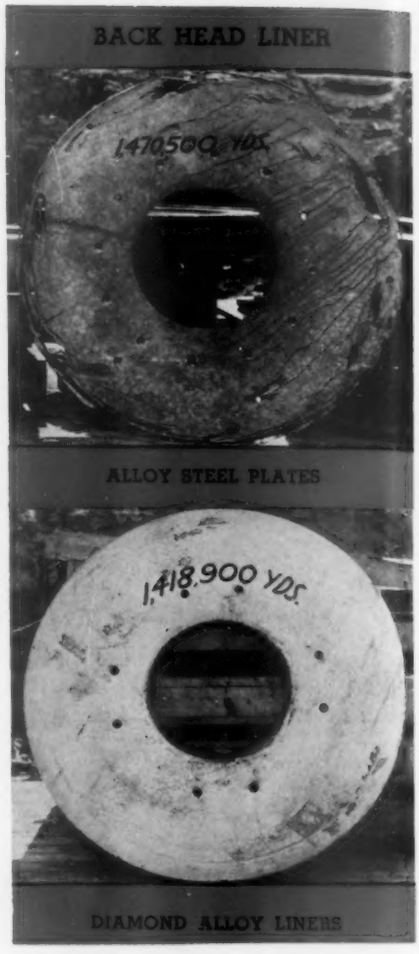
DIAMOND

ALLOY

DREDGE PUMP LINERS

FRONT HEAD LINERS Fort Peck dredging equipment uses single-stage centrifugal dredge pumps. The original front head liners (upper left) made of plain cast steel, seldom lasted for more than one and one-half million cubic yards of pumping. The one pictured shows the liner completely eaten through and the front head severely attacked after producing 1,470,500 cubic yards. The new DIAMOND alloy liners lower left) have a Brinnell hardness of approximately 600, and a tensile strength of over 50,000 pounds square inch. The one pictured above (right) has produced 3,676,800 cubic yards and is still in good condition for further service.

BACK HEAD LINERS Fort Peck dredge and booster pumps were initially equipped with alloy steel plates for back head liners (upper right). These were good for no more than one and one-half million cubic yards of production. The new DIAMOND alloy liners pictured above (lower right) were scarcely touched after producing 1,418,900 cubic yards.



Now Liner Plates on Ft. Peck Dredge Pumps *last up to 8 times longer*

and handle millions more cubic yards

"Diamond alloy is a new metal used for dredge pump wearing parts and for other castings required to withstand severe abrasion and corrosion. Its record of service is outstanding. This is equally true of its record with the U. S. Engineer at Fort Peck, Montana, where the 28" dredge pump front and back head liners pictured above were used. DIAMOND alloy has outlasted other metals normally used in dredge pumps as much as eight to one. You, too, can expect exceptional life from its use.

"Diamond alloy liners can now be supplied for dredge pumps where the remainder of the pump is made of manganese steel. This combination gives correct application for both Diamond alloy and manganese steel. The manganese steel to absorb shock and abrasion on the shell and impeller and the Diamond alloy to withstand the abrasion on the liners.

"Pettibone Mulliken Corporation manufactures complete dredge pumps and such dredging equipment as cutters, cutter heads, flap valves and pipe fittings. Their engineers are available for your assistance in the design of complete dredges. DIAMOND dredge pumps are made in sizes from 4" up. The wearing parts are made of DIAMOND alloy or manganese steel, or the best alloy steel suited to the particular use to which the pumps are to be subjected."

STEAM RAILROAD TRACK WORK
ELECTRIC RAILWAY SPECIAL TRACK WORK
HEAVY MACHINE WORK
FORGINGS
DREDGING EQUIPMENT

Write for Particulars

MANGANESE STEEL CASTINGS
CARBON & ALLOY STEEL CASTINGS
HIGH TEST GREY IRON CASTINGS
ALLOYED IRON CASTINGS
DIAMOND DREDGE PUMPS

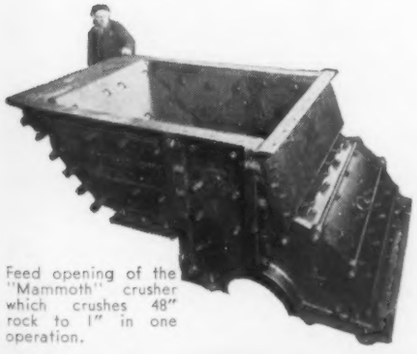
PETTIBONE MULLIKEN CORPORATION

GENERAL OFFICE & WORKS-4710 WEST DIVISION ST.-CHICAGO, ILL.

Williams Hammer Crushers

Handle Larger Rock :: 50% Less Investment :: Better Product

The "Jumbo Jr." which reduces "one-man" size limestone to 1", ¾" or agstone.



Feed opening of the "Mammoth" crusher which crushes 48" rock to 1" in one operation.

A Size for Every Job

The "Mammouth" crushes 48" rock to 3", 2" or 1" in one operation. Takes the place of a primary breaker and recrusher.

The "Jumbo" reduces 20" to 30" rock to 1¼" and smaller.

The "Jumbo Jr." crushes screen rejects or "one man" size rock to 1", ¾", ½" and finer.

The "NF" type is supreme as a recrusher for reducing 5" stone to 1", ½" or agricultural limestone.

The "Non-Clog" for crushing wet muddy rock. Cannot be clogged.

Fine Grinders • Air Separators • Dryer Mills

The Williams Patent Crusher & Pulverizer Co.

802 St. Louis Ave. ST. LOUIS, MO.

Sales Agencies in All Principal Cities Including

CHICAGO 37 W. Van Buren | NEW YORK 15 Park Row | SAN FRANCISCO 326 Rialto Bldg.

THE WILLIAMS PATENT CRUSHER & PULVERIZER CO. ST. LOUIS MO. U.S.A. TRADE MARK

REG U.S. PAT OFF

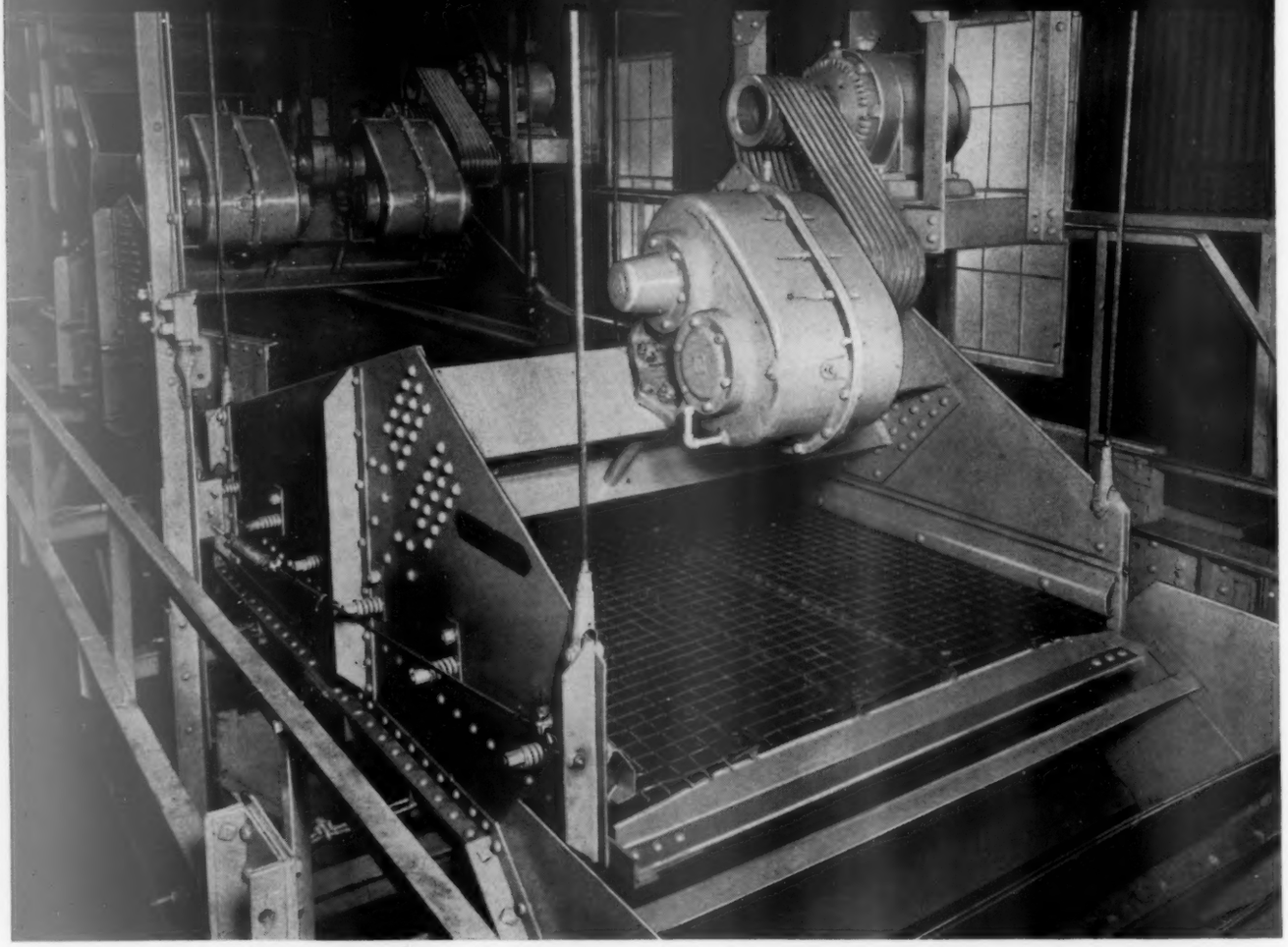
Williams

OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD

Williams

PATENT CRUSHERS GRINDERS SHREDDERS

LOW HEAD ROOM *Saves Money*



THE Allis-Chalmers Low-Head Horizontal Vibrating Screens give you greater screen area in less space ... greater tonnage of accurately sized stone and ore at lower cost than older, slower moving type of screens.

Low-Head Screens, as the name suggests, take very little head room. They operate with no inclination and so can be installed one right under another with little room between screens or in tandem in a horizontal plane as illustrated. This often saves expensive remodeling to obtain greater screen capacity.

Low-Head Screens are built with single, double or triple decks from 3′x 6′ to 6′x 14′ or larger. Allis-Chalmers Low-Head Screens are described in Bulletin 1478A. Write for your copy.

643

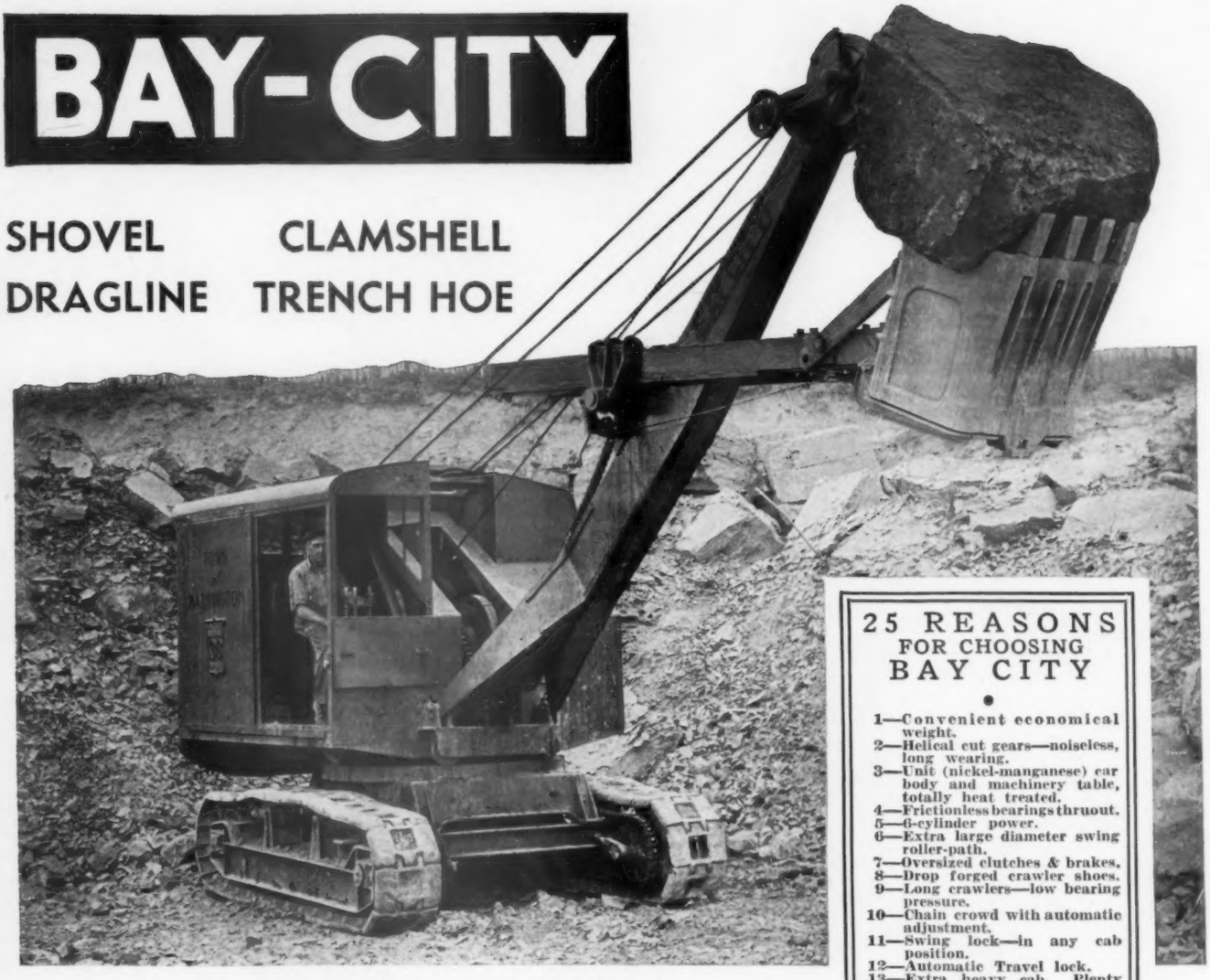
EQUIPMENT ENGINEERS TO INDUSTRY

ALLIS·CHALMERS

MILWAUKEE WISCONSIN

BAY-CITY

SHOVEL CLAMSHELL
DRAGLINE TRENCH HOE



Illustrating Heavy Duty ⅝ yd. Diesel Powered Shovel

25 REASONS FOR CHOOSING BAY CITY

1—Convenient economical weight.
2—Helical cut gears—noiseless, long wearing.
3—Unit (nickel-manganese) car body and machinery table, totally heat treated.
4—Frictionless bearings thruout.
5—6-cylinder power.
6—Extra large diameter swing roller-path.
7—Oversized clutches & brakes.
8—Drop forged crawler shoes.
9—Long crawlers—low bearing pressure.
10—Chain crowd with automatic adjustment.
11—Swing lock—in any cab position.
12—Automatic Travel lock.
13—Extra heavy cab. Plenty inside working room.
14—Fast operating speeds.
15—Two travel speeds.
16—All steel construction.
17—Three lever control.
18—E-Z clutch control.
19—High pressure lubrication thruout.
20—Safety worm boom hoist.
21—Separate hoist drums.
22—Internal swing teeth.
23—Unequalled steering at full speed.
24—Convertible — without machinery change.
25—Accessibility for inspection or adjustment.

12 MODELS—⅜ to 1¼ Cubic Yard
Also ⅜, ½, ⅝ yd. Truck Mounted Shovels and Cranes

VISIT OUR EXHIBIT
ROAD SHOW — CLEVELAND — JAN. 17-21

CHAIN CROWD—UNIT CAST BODY AND REVOLVING TABLE, TOTALLY HEAT TREATED — DRUMS ON SEPARATE SHAFTS — HELICAL CUT GEARS — ANTIFRICTION BEARINGS —LARGE DIAMETER ROLLER PATH—ELECTRIC DIPPER TRIP—SAFETY WORM BOOM HOIST —SLOW ENGINE SPEEDS—AUTOMATIC TRAVEL LOCK—ALL PARTS ACCESSIBLE—ALLOY CAST BUCKETS.

BAY CITY is unalterably committed to these recognized quality ideals of design and construction for the reason that regardless of greater manufacturing cost they are definitely proven to be most desirable, economical and efficient in operating service.

You cannot equal BAY CITY value or performance—regardless of price.

SENSIBLY DESIGNED—CAREFULLY ENGINEERED — CONSCIENTIOUSLY MANUFACTURED— HONESTLY ADVERTISED—FAIRLY AND MODERATELY PRICED

BAY CITY SHOVELS Inc. (Eastern Offices, Roselle, N. J.) **BAY CITY, MICH.**

HIGHER TONNAGE

GREATER ECONOMY

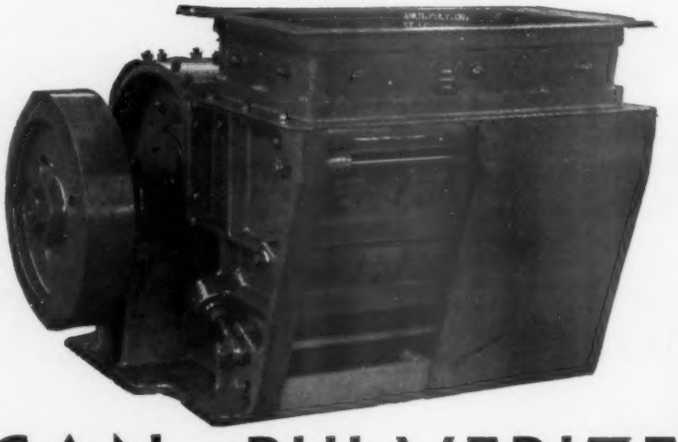
For 1938-The New Improved American

HAMMERMILL CRUSHER

It is the plus value for 1938, bringing all the developments of "American's" 25 years' experience into the most efficient one-operation crusher of its type. It produces a uniform material of round or cubical shape, free of slivers or finger stones—direct from "one man" size stone, or rejects, down to aggregate or agricultural sizes in a single pass. Quickly adjustable for making minimum or maximum fines.

SUPER-FEATURES

Compact Design
Massive Construction
Cast Adjustable Platen
Cast Steel Discs
Heavy Alloy Steel Shaft
SKF Roller Bearings
Dust-proof Pillow Block
Manganese-lined Crushing Chamber
All Parts Readily Accessible



ALL CAPACITIES

30" x 16"— 5 to 20 Tons
30" x 22"—10 to 30 "
30" x 28"—16 to 40 "
30" x 34"—20 to 46 "
30" x 40"—25 to 55 "

Portable or Stationary

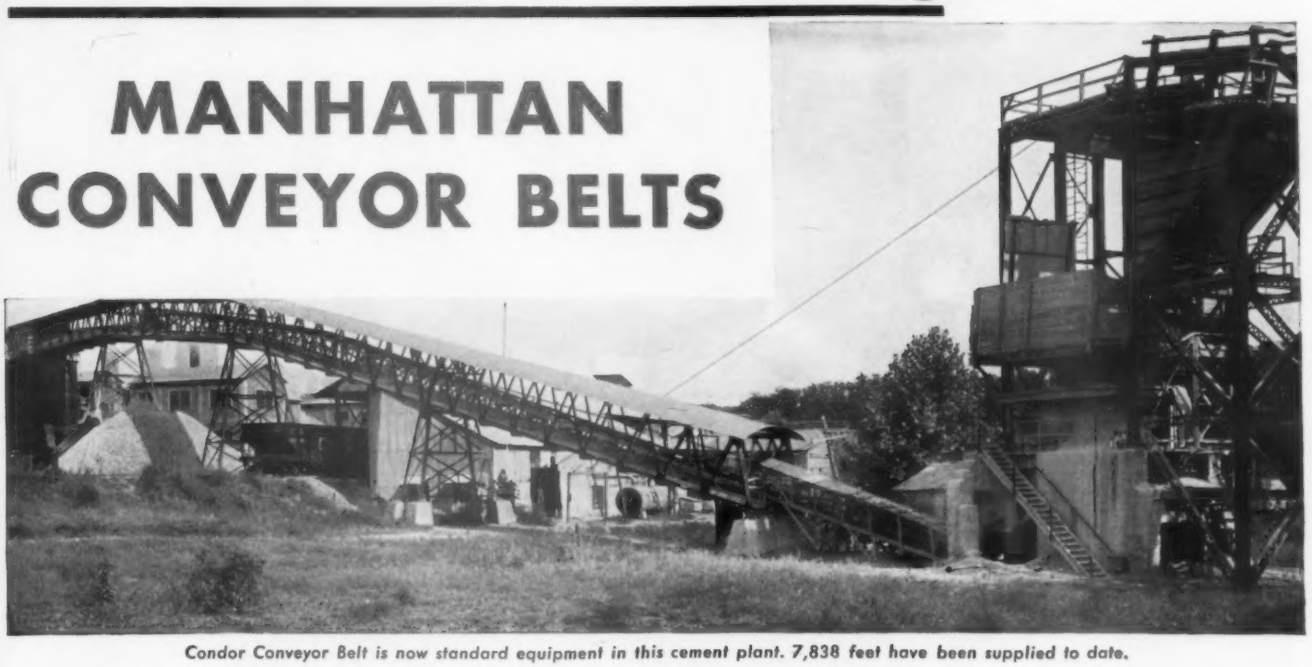
Write for Bulletin No. 28

AMERICAN PULVERIZER CO.

1289 Macklind Ave. - - - St. Louis, Mo.

For Low-Cost Handling . . . use

MANHATTAN CONVEYOR BELTS



Condor Conveyor Belt is now standard equipment in this cement plant. 7,838 feet have been supplied to date.

Whether it's sand or clinker, gravel or crushed stone, cement or heavy, sharp rock, a steadily increasing number of plants report tonnage and economy records being broken by their Manhattan Conveyor Belts.

Long or short hauls, high or low lifts, heavy or light material, wet or dry loads—are all met with two-fisted performance — Manhattan performance.

This is the natural result of research, design and engineering principles applied to the construction of every type and size of Manhattan Conveyor Belts.

Condor PRODUCTS

Transmission Belt	Suction Hose	Launder Lining
V-Belt	Fire Hose	Industrial Brake Lining
Conveyor Belt	Hydraulic Hose	Molded Rubber Goods
Air Hose	Steam Hose	Rubber Lined Tanks
Contractors Hose	Water Hose	Rubber Covered Rolls
Sand Blast Hose	Chute Lining	Abrasive Wheels—Rubber Bonded

Manhattan Sand and Gravel Belts on a portable conveyor.

Typical of Manhattan's engineering ability to build the right belt for the job is Condor Conveyor Belt for heavy duty. Its "Homo-Flex" Construction provides a homogeneous rubber and fabric structure. Six advantages that mean longer life . . . extra service . . . are a natural result.

Advantages of Condor "Homo-Flex" Construction:

1. Extremely flexible—troughs naturally even in thick ply and long narrow belts.
2. Reduces stretch to a new minimum.
3. Gives longer belt life due to complete bonding of every member in the belt into a homogeneous structure.
4. Ply separation is eliminated.
5. Inseparable wear-resisting covers.
6. Resists puncture to a high degree.

SOLD BY LEADING JOBBERS

THE MANHATTAN RUBBER MFG. DIVISION
OF RAYBESTOS-MANHATTAN, INC.
EXECUTIVE OFFICES AND FACTORIES, 18 TOWNSEND ST., PASSAIC, N. J.

Reduces Your Costs 30 to 50%

DEMPSTER DUMPSTER

DEMPSTER-DUMPSTER at work in a quarry.

"The most practical piece of equipment we have ever used in our quarry for moving stone. So simple in construction and operation that any truck driver can operate it at once. It is proving a real time and money saver." . . . says the superintendent of a large and nationally known lime manufacturing concern.

Close-up view of DEMPSTER-DUMPSTER in action.

The DEMPSTER-DUMPSTER is the greatest development in years for eliminating the high cost of hand loading. The truck never has to wait to be loaded — The unit is simple, compact and easily mountable on any truck chassis. It consists of specially designed detachable containers and a hoist for automatically lifting, carrying and dumping them. The containers are set at convenient points for filling, where they can be quickly picked up and hauled, and discharged to a crusher or other destination. This method is a vast improvement over the conventional methods of loading trucks, dump carts and industrial haulage, and saves as much as 30% to 50%, or more, in quarry operations or other material handling jobs.

Write for Bulletin containing details of the operation and the wide range of applications of this time-saving unit for quarries and industrial plants.

Exclusive sales territory available for responsible dealers.

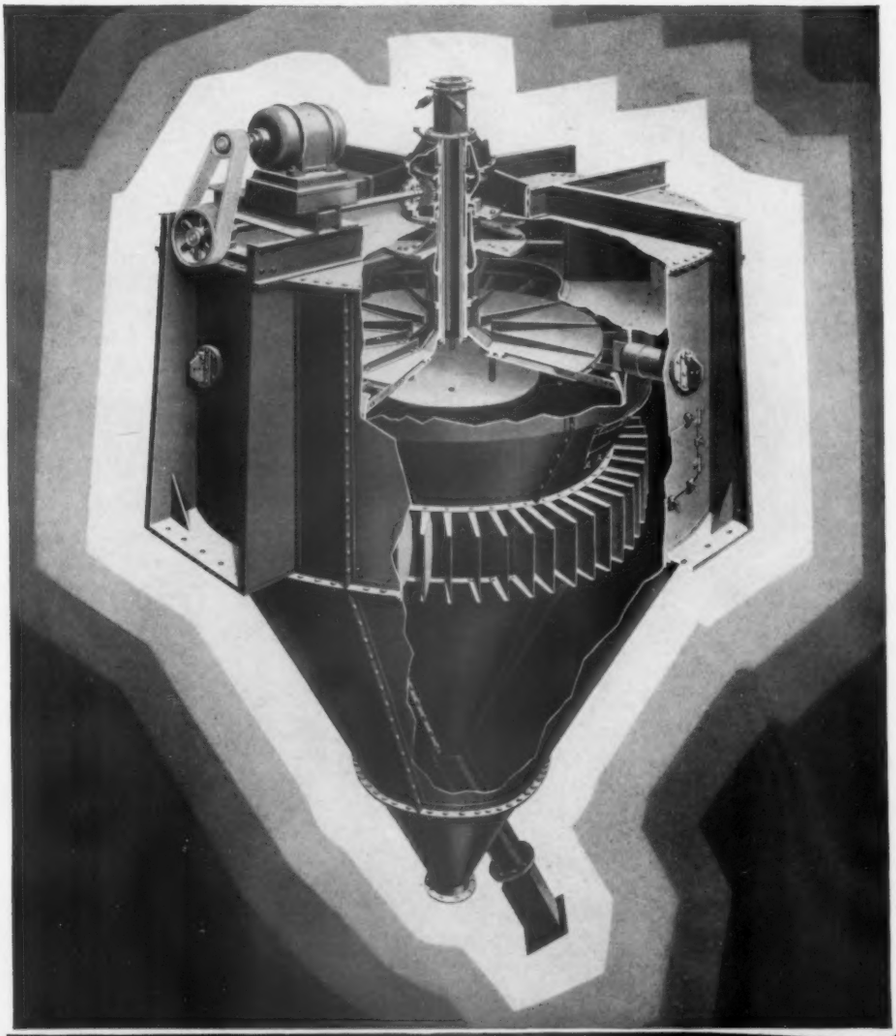
DEMPSTER BROTHERS, Inc.

Springdale Ave. & Southern Railway
KNOXVILLE, TENNESSEE

Now the DOUBLE Whizzer Raymond Separator

Another advance in methods of producing the high surface area cements of today is offered in the modern *double whizzer type* Raymond Mechanical Air Separator. It gives closer separation of the fines, more accurate control over particle sizes and enables the operator to obtain any fineness desired by a simple adjustment made from the outside while the machine is running. Investigate this economical method of classifying finished cement to specific surface area of 1450 to 3000 or better.

. . . For Standard and High Early Strength CEMENT



Here's typical performance in a mid-western plant using a double whizzer separator in closed circuit with two 7' x 26' tube mills. Output increased to 80 barrels per hour at 2800 surface area as compared to former open circuit production of 70 barrels per hour at 1800 surface area, requiring re-grinding to get 2450 specific surface area on additional mills.

●

The same separator in closed circuit with one tube mill produces 150 barrels per hour of standard cement at 1600 surface area, as against 95 barrels in open circuit—a 57% gain by use of the Raymond Separator.

●

The operator is able to adjust the separator from the outside in a few minutes time, without any internal changes in the machine, to produce any surface area cement from 1800 to 2800.

Write for Separator Bulletin No. 35

RAYMOND PULVERIZER DIVISION
COMBUSTION ENGINEERING COMPANY, INC.
1321 North Branch Street **CHICAGO**
Sales Offices in Principal Cities • • • In Canada: Combustion Engineering Corporation, Ltd., Montreal

Leadership...

Earned and Maintained by

FULLER

OUR AIM . . . Leadership in the field, well earned and maintained for many years and always the motto of Fuller engineers, has built a reputation and business with a sound foundation. This standing has not been attained alone but through the kind and willing cooperation and assistance of our many friends throughout the industry.

A PLEDGE . . . Fuller equipment will always be built with "our aim" before us, with a view toward maintaining the highest standards and giving the best service humanly possible.

FULLER COMPANY
CATASAUQUA, PENNSYLVANIA

Chicago: 1118 Marquette Bldg.
San Francisco: 320-321 Chancery Bldg.

G-7

FULLER-KINYON, FLUXO, AND AIRVEYOR CONVEYING SYSTEMS · · · · ROTARY FEEDERS AND DISCHARGE GATES
ROTARY AIR COMPRESSORS AND VACUUM PUMPS · · · AUTOMATIC BATCH WEIGHERS · · · BIN SIGNALS

EXPAND

Your Field of Profitable Operation with an A-W Portable

● 51,449,000 tons of gravel . . . 65% of the tonnage used on paving operations in 1936 . . . were produced by non-commercial crews, says the U. S. Bureau of Mines. Here's a rich field . . . ripe for cultivation by commercial producers equipped to compete beyond the economical hauling zone of a fixed plant.

With an A-W Portable as an auxiliary to your fixed plant you're prepared to reach out anywhere for this profitable added volume. Your present market limitations are expanded many times. Your sales and profit opportunities are multiplied.

Records show A-W Crushers can often produce material for less than the cost of fixed plant production. This saving plus the savings in freight and truck haulage make one or more of these plants profitable for you to own.

Big in capacity, powerful and efficient . . . the A-W crushing and screening plant is built to deliver material in volume at the job. Easily set up for operation anywhere in a few hours . . . this self-contained unit is readily transportable on steel or pneumatic tired wheels.

Unusually deep jaws, extra strong oversize shafts, and oversize roller bearings permit high primary breaker crushing speeds for big output. The secondary crusher (roll or jaw) has the same honest construction throughout, assuring continuous operation at top speed.

Judge for yourself the market possibilities of this job tested portable equipment. Mail the coupon for full details.

AUSTIN-WESTERN ROAD MACHINERY CO.
1841 Barrows St., Aurora, Ill.

AUSTIN-WESTERN

The Austin-Western Road Machinery Co.,
1841 Barrows St., Aurora, Ill.
Please send literature on A-W Portable Crushing Plants

Name .....

Address ..... State .....

City .....

LIMA enters 1938 the pacemaker among shovels, draglines and cranes. Efficient, high speed operation of LIMA machines continue to smash yardage records everywhere. In quarries, brick plants, sand and gravel pits, coal and metal mines, lumber, general construction, etc., LIMA is giving the kind of service that users want—service that steps up production and delivers big yardage at low cost. Start the new year right with a LIMA shovel, dragline or crane on your job.

LIMA LOCOMOTIVE WORKS, INCORPORATED
SHOVEL AND CRANE DIVISION
LIMA, OHIO, U. S. A.

NEW YORK
167th Street and Sedgwick Avenue

NEWARK, N. J.
317 Frelinghuysen Avenue

DALLAS
1304 McKinney Avenue

MEMPHIS
77 McCall Street

SEATTLE
1938 First Avenue South

SAN FRANCISCO
200 Bush Street

LOS ANGELES
2001 Santa Fe Ave.

Tyee Machinery Company, Ltd.
Vancouver, B. C.

The General Supply Co. of Canada, Ltd.
Ottawa, Ont.

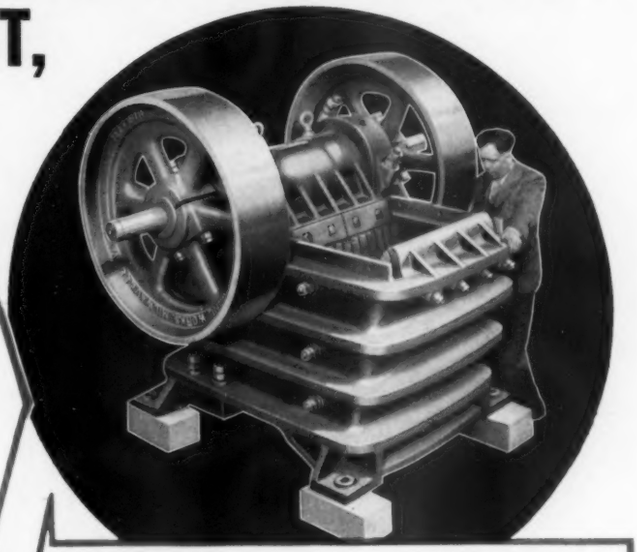
St Again in 1938

LIMA
Convertible
SHOVELS
DRAGLINES
and CRANES

TELSMITH

LONG LIFE, LOW UP-KEEP EQUIPMENT

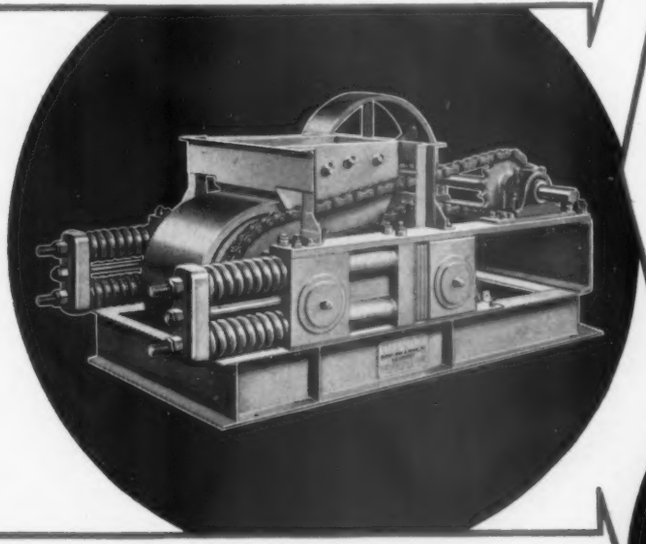
BETTERS THE PRODUCT, LOWERS THE COST



TELSMITH - WHEELING JAW CRUSHER

This super-strong, all-steel force feed jaw crusher gives greater reduction in one process than any other type of breaker. Cylindrical roller bearings and higher speed almost double capacity without any greater expenditure for power. Two toggle settings and simple adjustment allow wide range of product sizing. Made in seven sizes. *Write for Bulletin W-15.*

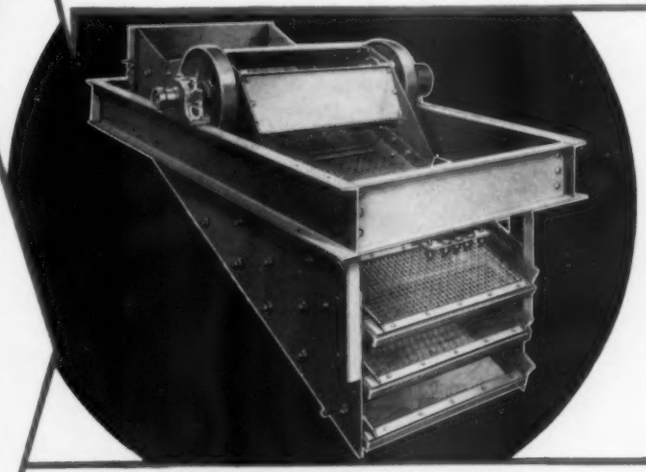
FOR COARSE CRUSHING



TELSMITH DOUBLE ROLL CRUSHER

Telsmith's latest contribution to secondary crushing is this double roll crusher, designed for quantity production of fine aggregate at moderate reduction ratios. The Telsmith Roll Crusher requires little headroom and is economical in first cost. Anti-friction bearings running in oil and spring release insure continuous operation free of break-downs. *Write for Bulletin L-15.*

FOR SECONDARY CRUSHING



TELSMITH PULSATOR

This heavy-duty vibrating screen handles sand, gravel, crushed rock, ore or coal *efficiently*, wet or dry. Maximum screening action, uniform on every inch of wire, on every deck, under any load. Anti-friction bearings and special sealing devices to protect working parts insure long life and low up-keep. Made in eleven sizes in single, double, or triple deck. *Write for Bulletin V-15.*

FOR UNIFORM SCREENING

Associates in Canada: Canadian Vickers, Limited
Montreal and Vancouver

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New York City

211 W. Wacker Drive
Chicago, Ill.

1013 Commercial Trust Bldg.
Philadelphia, Pa.

81 Binney St.
Cambridge, Mass.

412 Westinghouse Bldg.
Pittsburgh, Pa.

Brandeis M. & S. Co.
Louisville, Ky.

MC-7-38

SMITH ENGINEERING WORKS, 504 E. CAPITOL DRIVE, MILWAUKEE, WIS.

PIONEER BUILDERS OF THE TWO-STAGE AIR-COOLED PORTABLE

Two-Stage Air-Cooled PORTABLE COMPRESSORS

This Model 85A two-wheel trailer-mounted Portable Compressor is one of the new machines. It operates one JA-55 Jackhamer or two of the largest paving breakers.

The Famous JA Family of JACKHAMERS

SOLVE YOUR DRILLING PROBLEMS WITH JACKBITS

Contractors everywhere are adopting Jackbits. They reduce drilling costs and speed up the work.

To the modern line of Two-Stage Air-Cooled Portable Compressors we have added several new models. These will be on display for the first time at our booth, Number E-36 at the Cleveland Road Show on January 17th to 21st inclusive.

We invite every roadbuilder and contractor to call at our booth and look them over. Other products which we will have on display are rock drills, Jackbits, paving breakers, hoists and pneumatic tools, each of which are made in a complete range of sizes and types.

If you cannot attend the show, ask our nearest I-R branch or dealer for complete information and catalogs 3264 and 1604-F.

Atlanta, Birmingham, Boston, Buffalo, Butte, Chicago, Cleveland, Dallas, Denver, Detroit, Duluth, El Paso, Hartford, Houston, Kansas City, Knoxville, Los Angeles, Newark, New York, Philadelphia, Picher, Pittsburgh, Pottsville, Salt Lake City, San Francisco, Scranton, Seattle, St. Louis, Tulsa, Washington

Ingersoll-Rand

11 BROADWAY, NEW YORK CITY

new 603 KOEHRING

see it at the ROAD SHOW

KOEHRING HEAVY DUTY

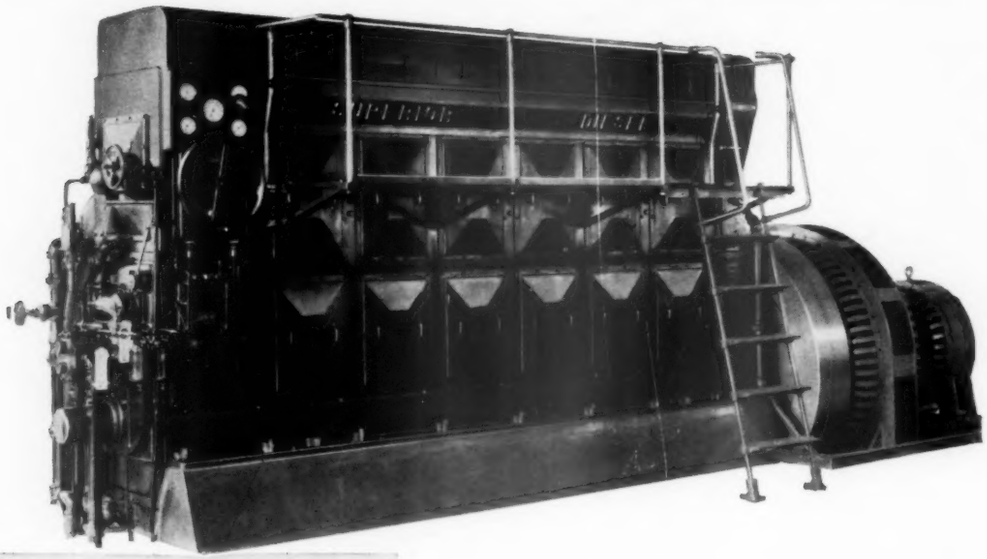
Enclosed gears, anti-friction bearings, independent selective swing and travel speeds, and high line speeds, are a few outstanding advantages of the new Koehring 603 Excavator. It handles a 1½ yard dipper as a shovel, and is fully convertible to dragline, crane or pull shovel. See this new Excavator at the Road Show or write for the new 603 Bulletin.

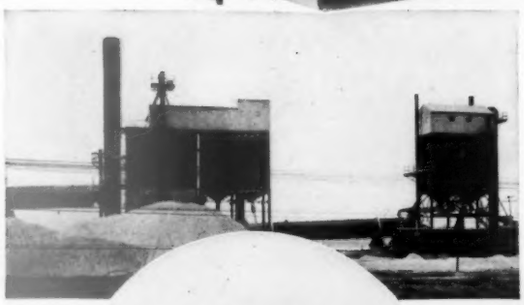
KOEHRING COMPANY

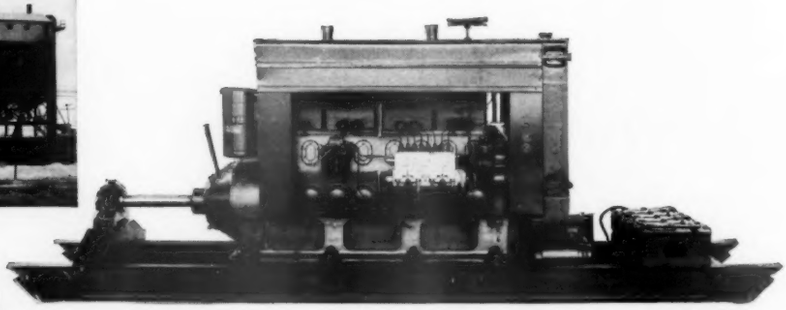
Pavers · Mixers · Shovels · Cranes · Draglines · Dumptors · Mud-Jacks

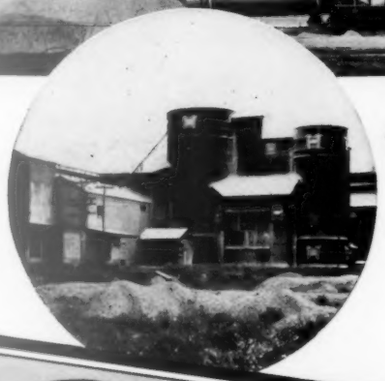
3026 WEST CONCORDIA AVENUE, MILWAUKEE, WISCONSIN

WE'LL BE THERE..









Superior DIESELS

HEAVY DUTY MODELS:
50 to 810 H.P.,
250 to 720 R. P. M.

HIGH SPEED MODELS:
15 to 150 H.P.,
900 to 1800 R. P. M.

Old friends and new friends of Superior Diesels in the rock crushing, quarrying and sand and gravel industries—meet us at the 21st Annual Convention and Exhibition of the National Crushed Stone Association, to be held at the Netherland Plaza Hotel, Cincinnati, Ohio, January 24-25-26—also at the 22nd Annual Convention and Exhibition of the National Sand and Gravel Association, to be held same place, February 1-2-3.

There, you may see one of Superior's completely equipped portable Diesels (illustrated above) which is so effective when spotted in a pit or quarry, exactly where economical power is needed . . . Information on the larger Superior Diesels, too, will be waiting for you . . . We'll be glad to see you.

THE NATIONAL SUPPLY COMPANY • SUPERIOR ENGINE DIVISION

FACTORIES: Springfield, Ohio; Philadelphia, Pa. • SALES OFFICES: Springfield, Ohio; Philadelphia, Pa.; New York, N. Y.; Los Angeles, Calif.; Houston, Texas.

Hercules Looks Ahead

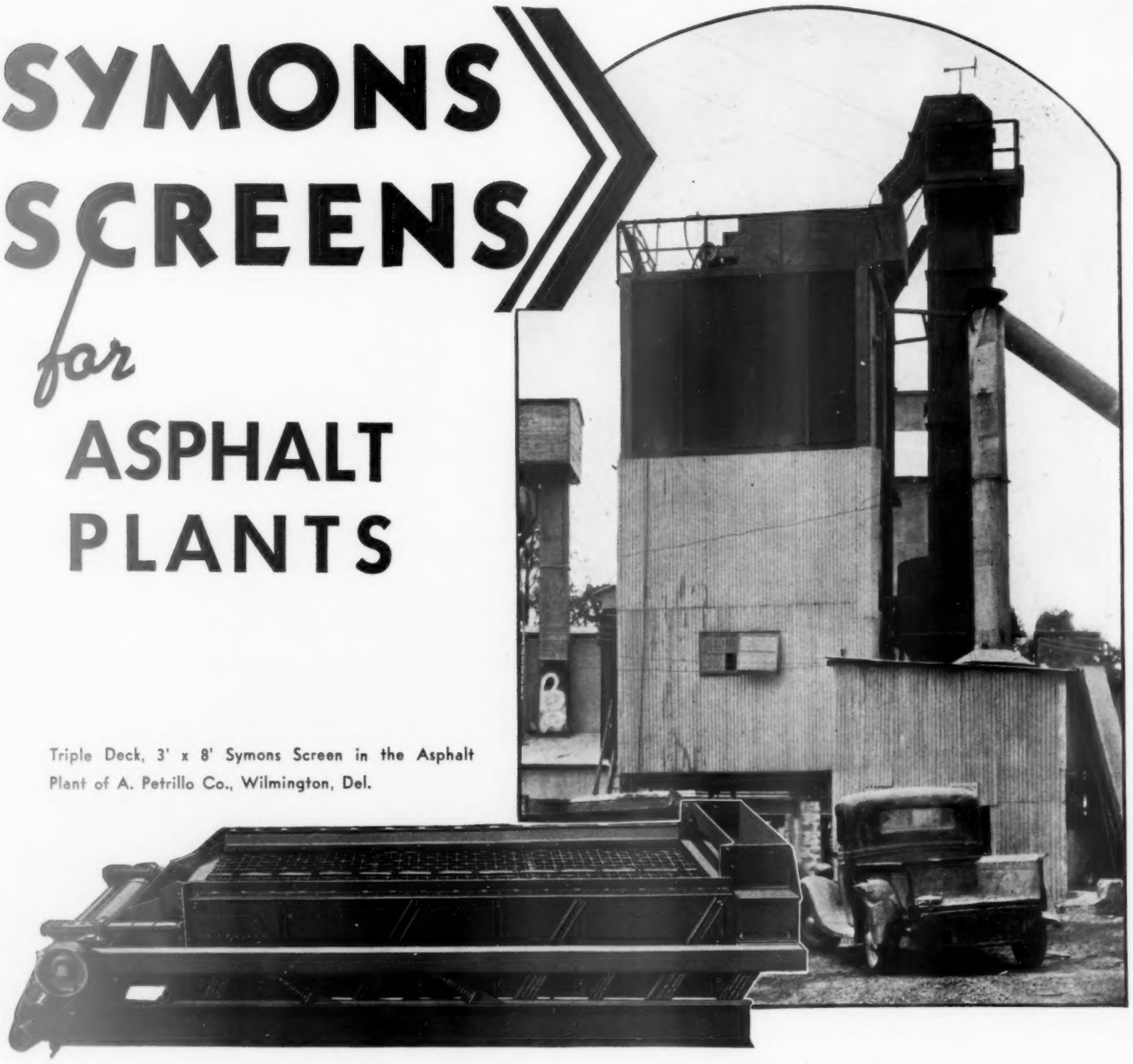
TWENTY-FIVE *years ago Hercules Powder Company started in business as a manufacturer of industrial explosives for mining, quarrying, construction, and agricultural purposes. Not only has Hercules maintained a leading position in the explosives industry, but soundly directed expansion and diversification have widened the scope of the company's services. Today, Hercules is also a major factor in the production of cellulose products, naval stores, chemical cotton, and specialized chemicals used in the manufacturer of paper and textiles.*

There are dozens of applications of Hercules products, besides explosives. Some of these, developed by the company's technical service and research staffs, may interest you. Further information about them can be obtained by writing for "Looking Ahead," the illustrated booklet describing the growth of Hercules Powder Company during its first twenty-five years, and some of the research which the company is doing to meet the future demands of industry.

HERCULES POWDER COMPANY
Incorporated
960 KING STREET
WILMINGTON, DELAWARE

A-66

SYMONS SCREENS *for* ASPHALT PLANTS



Triple Deck, 3' x 8' Symons Screen in the Asphalt Plant of A. Petrillo Co., Wilmington, Del.

THE FLAT SYMONS SCREEN definitely meets the needs of asphalt plants. Since it is set in a level position and has a positive screening action, close and accurate sizing is assured. A flat screen also requires far less headroom than does the ordinary screen. This reduces the height of structure and length of elevator, and thereby lowers the building cost. It is readily enclosed, the motor and driving mechanism being located outside the enclosure and away from dust and heat.

With the various screen cloth combinations possible only with a flat screen and with a wide range of sizes and types, there is a Symons Screen which exactly meets your screening needs.

NORDBERG MFG. CO., MILWAUKEE WISCONSIN

NEW YORK 60 E. 42nd St. | LOS ANGELES Subway Term. Bldg. | TORONTO Concourse Bldg. | MEXICO CITY Edificio Cook | LONDON Bush House

THEW CENTER DRIVE

Rock-Worthy

● There are few shovels that thrive on an all-rock diet, but loading out 26-yd. cars of limestone to feed a 48-inch crusher is just so much meat to this Lorain-87 Diesel of the Bessemer Limestone & Cement Co., Bessemer, Pa.

There is always plenty of rock on tap at the crusher when Lorains are working in the pit, for here are shovels that can stand the gaff. They are rugged in construction; have direct high-efficiency power transmission; and are equipped with new type boom constructions which are designed accurately for torsion as well as bending and compression stresses.

If it's big production with economy that you are after, write today for catalogs describing Lorains. You will find them mighty revealing as to what real rock shovels have to offer.

THE THEW SHOVEL COMPANY • LORAIN, OHIO

LORAINS 3/8 to 2 YD.

IS FATHER TIME HARD ON YOUR SCREENS?

DOES your screening fail in the "prime of life"... or does it go on to a ripe old age?

The life span of wire screening is based solely on the inherent toughness and stamina of the wire itself.

Wire making for the tough jobs... to meet exceptionally severe strength, vibration and abrasion requirements . . . has been Roebling's task for over 90 years.

If screen life extension is your problem, we offer you the benefit of this wire making knowledge, backed by a half century's experience in wire fabrication.

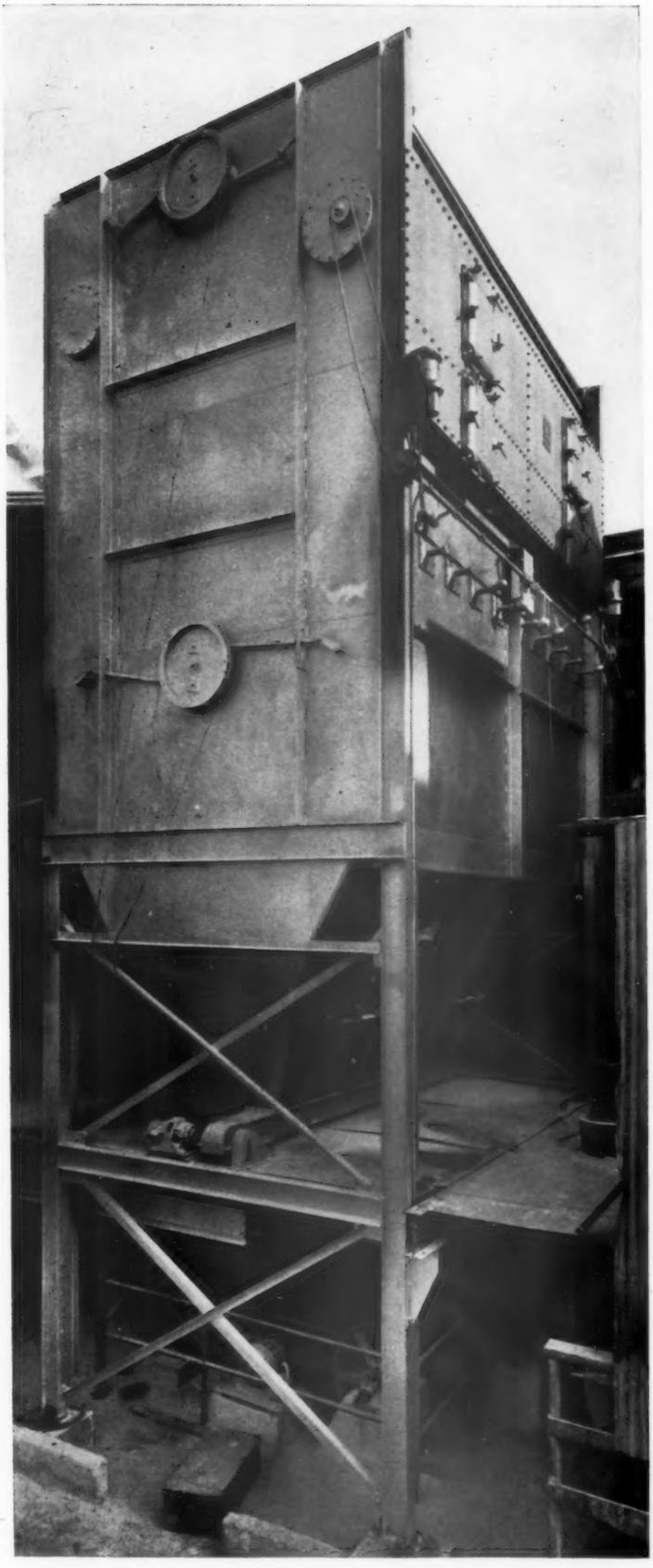
Roebling makes Wire Screening in a range of types and metals for all cleaning, grading and sizing service.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, N.J. *Branches in Principal Cities*

ROEBLING *Wire Screen*

TRADE JERSEY MARK

90 YEARS OF WIRE MAKING SPELLS THE DIFFERENCE



COTTRELL PRECIPITATORS SMALL or LARGE

Large installations of Cottrell Electrical Precipitators handling millions of cubic feet of gas per minute have been operating all over the world for periods as long as twenty-five years.

Experience in designing and installing this equipment enables Western Precipitation Corporation engineers to solve ANY dust, fog, fume or mist problem in ANY industry.

Based on this experience and comprehensive data, small Cottrell Precipitation units have been perfected and installed as the solution of a wide diversity of difficult problems, handling gases with acid or alkaline characteristics, at temperatures up to 1200° F. or higher, and with dust concentrations of various percentages and particles of all sizes down to true fume.

For large volumes of hot gases and efficiencies up to 99.99 per cent, ONLY the Cottrell process is available.

For smaller volumes and dependable high efficiency at low operating cost, ONLY the Cottrell process offers a guaranty that is entirely free from experimental hazards.

The illustration shows a Cottrell Electrical Precipitator recently installed for the Filtrol Corporation of Los Angeles for the collection of dust produced in the manufacture of activated clay for refining petroleum. The capacity is 16,000 c.f.m., recovering treated clay dust 1 to 3 microns from corrosive spent gases. The recovered dust is a premium product.

WESTERN PRECIPITATION CORPORATION

1018 West Ninth Street, Los Angeles, California • • New York, N. Y.

PRECIPITATION COMPANY OF AMERICA, LTD., Montreal

P I O N E E R I N D U S T A N D F U M E C O N T R O L

NOW! HARNISCHFEGER ANNOUNCES

THE NEW P&H MODEL 255

5 YEARS AHEAD OF THE FIELD

IT'S BUILT FOR SPEED!

Another great new Pacemaker is presented to the earth-moving field—an outstanding leader in its class! This husky 3/4-yard dirt-mover is built of alloy steels — all welded — the strongest, lightest excavator design known! Convertible to seven types of service, with ideal all-around capacity, this streamlined machine has many advanced operating features . . . See it on display for the first time at the 5-Star Road Show in Cleveland!

SPEED...IN TRAVELING

For easy maneuvering or fast traveling from job to job, the Model 255 has the change of pace to meet every need. With three forward speeds ranging from 3/4 to 3 miles per hour, it sets a new standard for mobility among machines in its class.

SPEED...IN DIGGING

With 3-speed transmission, there's a change of pace in digging, too, whether it's soft soil or the toughest clay. It has P&H HIGH-LEVERAGE DRIVE for snappier action and less clutch wear. The 255 has more horsepower than any other machine of its size!

SPEED...IN EARNING

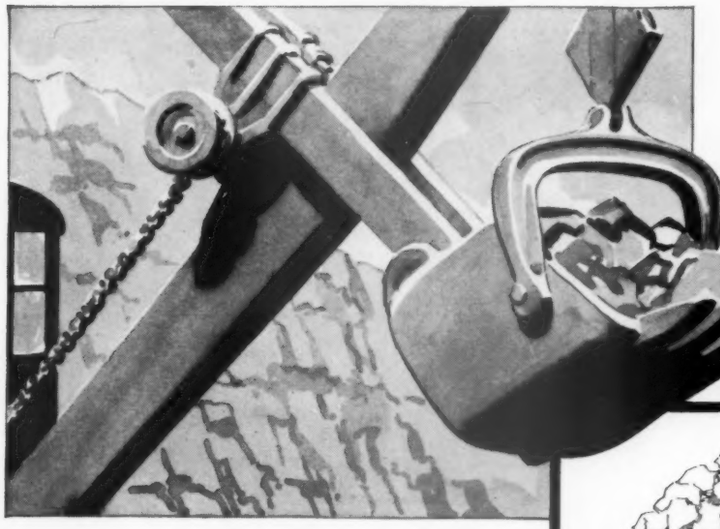
Here's the speed and flexibility to handle a larger variety of work and do it at lower cost. You can bid on more jobs—get more jobs—keep your machine busier and SHOW A BETTER YEAR 'ROUND OPERATING PROFIT with the P&H Model 255.

Learn more about this new dirt mover—see how it will help you get a greater share of 1938's digging jobs. Write for details. Address the Harnischfeger Corporation. 4451 West National Ave. Milwaukee, Wisconsin

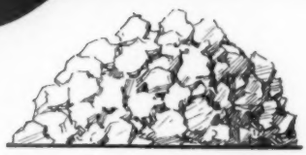
HARNISCHFEGER CORPORATION

EXCAVATORS ★ ELECTRIC CRANES ★ ARC WELDERS P&H HOISTS ★ WELDING ELECTRODES ★ MOTORS

If your shovel could talk



GOOD BLASTING HELPS ME MAKE GOOD



Well Blasted Rock
56.4 cu. yd. per hour

Rock well blasted moved almost as fast as common excavation! Time studies on 186,532 cu. yd. show:—

Common excavation . . . 59.2
Well blasted rock 56.4
cu. yd. per hour

Poorly Blasted Rock
44.3 cu. yd. per hour

Poorly blasted rock was handled at only 44.3 cu. yd. per hour in 1 yd. buckets—21% slower than well blasted rock—a reduction of more than 100 cu. yd. per day per shovel.

ATLAS Blasting is *Good* Blasting

Atlas explosives and Atlas methods will help your shovel *make good*—and help you make a good profit!

A time study on more than 400,000 cubic yards of rock proves that good blasting pays. And—that the man who is penalized by poor blasting *pays—and pays—and pays!*

Then—consider the extra profits and the extra savings *you* might be making. And—determine to make them with Atlas Apex!

ATLAS APEX develops a spreading, stressing action, distributing its controlled force throughout the burden. Atlas Apex gives better fragmentation, reduces secondary blasting—and allows increased spacing. Made in five grades—each with three velocities—it meets a wide variety of blasting conditions.

Let the Atlas representative arrange an Apex demonstration in *your* quarry!

ATLAS POWDER COMPANY, WILMINGTON, DEL.

Cable Address—Atpowco

Everything for Blasting

OFFICES

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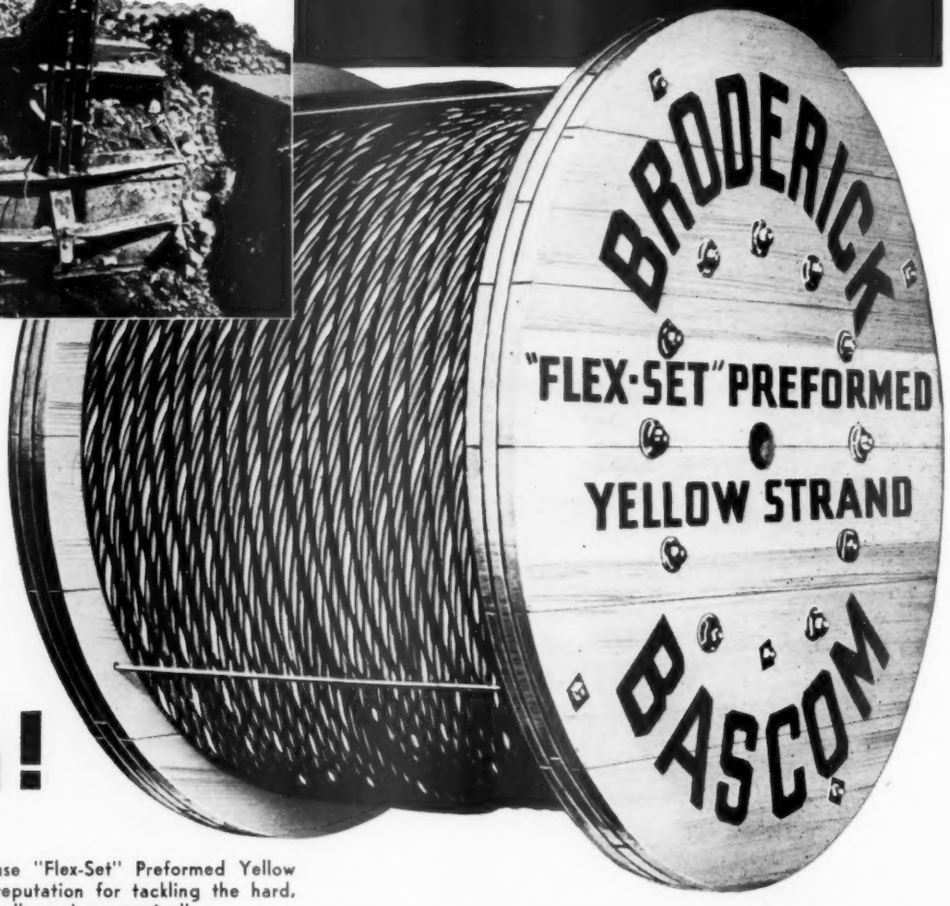
ATLAS
EXPLOSIVES

CHEMICALS ATLAS EXPLOSIVES

"Flex-Set" Preformed YELLOW STRAND



It's Tough!

Yes, tough is the word—because "Flex-Set" Preformed Yellow Strand has a well established reputation for tackling the hard, grilling jobs, and doing them well—and economically.

The same specially drawn wire is used that put Yellow Strand wire rope at the very top years ago. It still must pass searching tests in the B & B laboratory. But now the wires are pre-shaped to the helical form they occupy permanently in the finished rope.

And what is the result? *Longer life* — because the rope is practically pre-broken in, rotation on shafts and drums is greatly reduced, and there is remarkable resistance to kinking and fatigue.

Where the job is tough—on power shovels, dragline machines, derricks, excavators—let a tough rope do the work. That's "Flex-Set" Preformed Yellow Strand.

Broderick & Bascom Rope Co., St. Louis

Factories: St. Louis, Seattle, Peoria. Branches: New York, Chicago, Seattle, Portland, Houston.

U-15R3

"Sly Dust Filter Unit"

"Sly Dust Control System above silo"

"The Sly Cloth Bag Filter medium"

DUST CAN BE COLLECTED

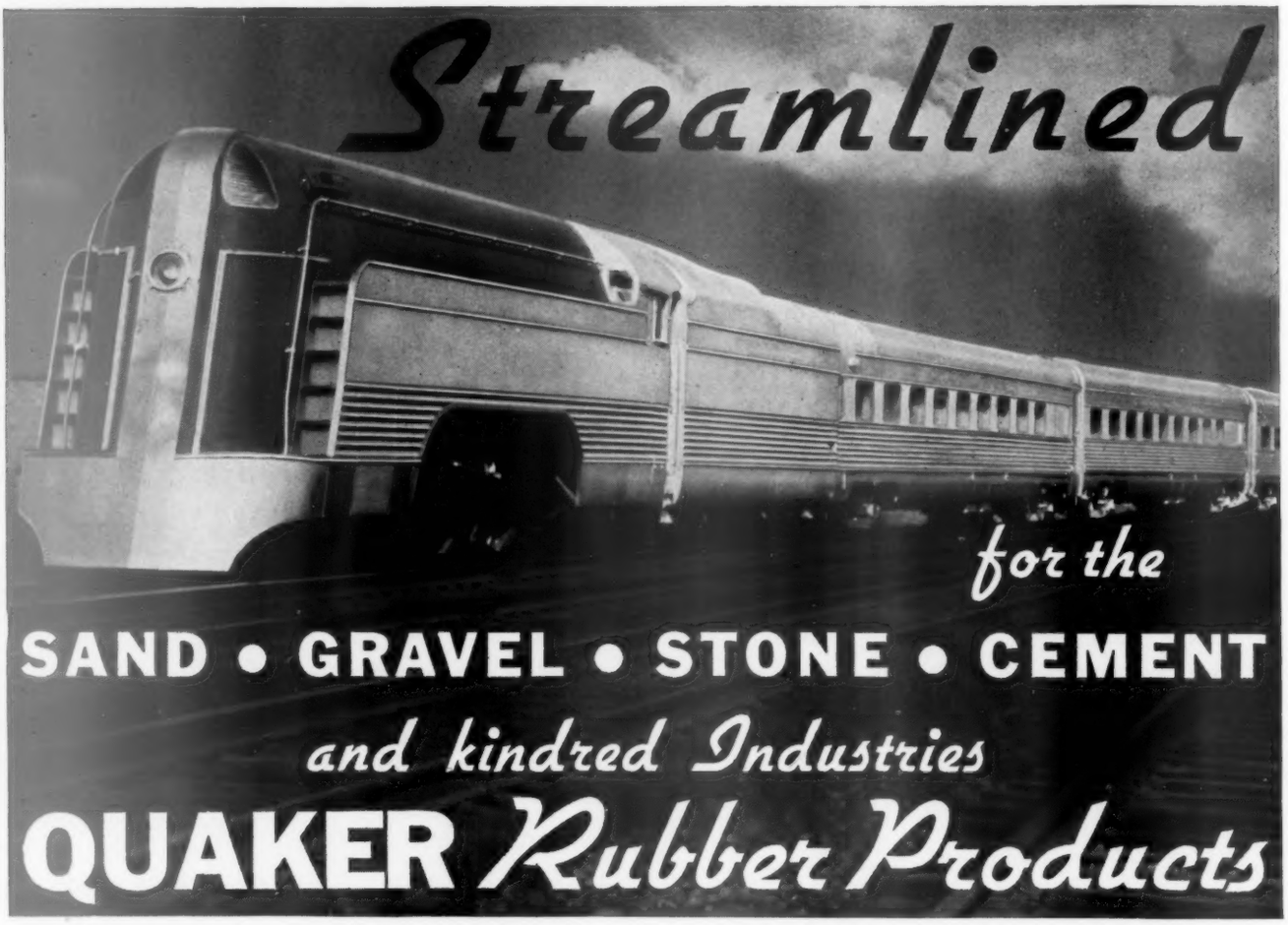
but you must first Suppress it!

Dust cannot be safely controlled until it has been collected. And the positive medium of collecting dust is through a cloth filter.

The Sly Cloth Filter is the safest medium for collecting all dust—from the largest to the smallest particle.

Sly experience is based on more than sixty years of leadership. Sly is the originator of the cloth filter. Write us. Sly Sales Engineers are ready to make an analysis of your plant.

THE W·W SLY MFG·CO·CLEVELAND·OHIO



Quaker factories are marvels of modern equipment and method. Manned by master craftsmen and supervised by experienced executives.

QUAKER Products:

Conveyor Belting
Transmission Belting
Hose
Packings
Dredging Sleeves

are in reality QUALITY Products.

Our representatives will be on the lookout for you at the Cincinnati Conventions.

If unable to attend, don't fail to write for samples and prices on Quaker Mechanical Rubber Goods.

QUAKER CITY RUBBER COMPANY

Over Fifty Years of Consistent Quality

PHILADELPHIA

NEW YORK **CHICAGO** **SAN FRANCISCO**

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AUG 11 1938

PIT AND QUARRY

Vol. 30 January, 1938 No. 7

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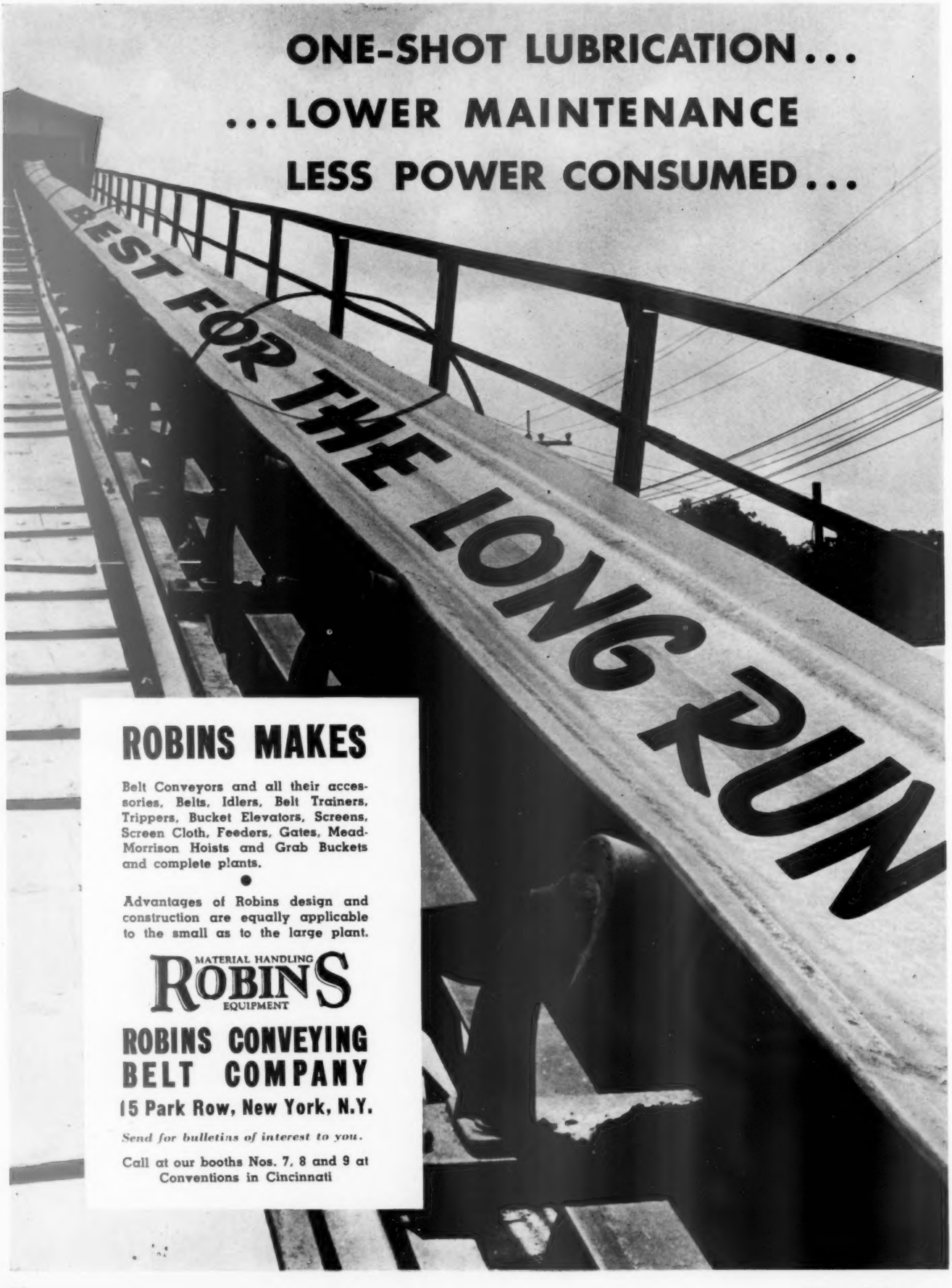

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High Court Upholds Gross-Receipts Tax

DAM BUILDERS ARE NOT EXEMPT

Taxes imposed by West Virginia and Washington on the gross receipts of contractors doing work within those states for the Federal government were upheld by the U. S. Supreme Court in three decisions handed down Dec. 6. The cases involved suits brought by the Dravo Contracting Co., builder of several dams on the Ohio and Kanawha Rivers against the state of West Virginia and by the Mason-Walsh-Atkinson-Kier Co. and David H. Ryan, contractors on the Grand Coulee Dam, against the state of Washington.

The state in which the work was performed has attempted, in each case, to tax the receipts of the non-resident contractor, who has been refusing payment on the ground that he was acting as the agent of the Federal government and that the tax would be, in effect, a tax laid upon the United States. The United States itself did not take this view, Attorney-General Cummings having held in a brief field last September that, despite the admitted fact that such taxation would increase the cost of Federal operations, the United States could not logically object to a "non-discriminatory" tax which was not specifically aimed at Federal operations.

Concentrated Phosphate Fertilizer TVA Product

Commercial production of calcium metaphosphate, a highly-concentrated phosphate fertilizer previously made only in laboratories, was recently announced by Dr. H. A. Morgan, a director of the Tennessee Valley Authority. More than 550 tons of the material, which contains 60 to 65 per cent. available plant food in comparison with 16 to 20 per cent. in the common phosphate fertilizers, was manufactured in a test plant constructed at Muscle Shoals.

In manufacturing the product, rock phosphate, silica and coke are placed in an electric furnace, creating hot phosphorous-carrying gases, which are burned and passed over lumps of rock phosphate. A chemical reaction results and molten calcium metaphosphate runs off and cools in amber-colored cakes. When ground it becomes a highly-concentrated plant food.

"The high degree of concentration of plant food in the product," Dr. Morgan said, "means that a farmer has to use only one ton of it to put on his soil where he would use four tons of superphosphates."

Gravel Plant Moves as Aid in Flood Control

The Indiana Gravel Co. will be forced to move its plant located on the White River near 14th St. in Indianapolis, following an order issued by City Engineer Henry B. Steeg, president of the Indianapolis Flood Control Commission.

The move is made necessary as part of the projects in development for control of floods on the White River. The channel where the plant is located is to be widened and straightened.

Gypsite Nontaxable in Wyoming, Court Rules

Gypsite when taken from the ground is not a valuable mineral and can not be taxed as such, District Judge V. J. Tidball of Laramie, Wyo., has ruled. The Wyoming state board of equalization and county officials at Laramie have been restrained by court order from collecting a special tax on gypsite production of the Certain-teed Products Co. which obtains a large amount of gypsite near Laramie. The special tax state and county officials sought to collect through litigation amounted to $1,500.

Florida 'Cement Tax' Again Ruled Illegal

INJUNCTION FAVORS IMPORTS

A temporary injunction enjoining Florida state officials from enforcing a $3 per ton inspection fee on foreign cement brought into that state, was recently handed down by a three-judge special tribunal in Federal court. The Florida tax was recently upheld by the State Supreme Court (*P&Q*, Nov. 1936, p. 33).

Proceedings were instituted in Federal District Court at Pensacola by the Bimco Trading Co., a New York firm importing cement from Belgium and Denmark. The Federal government intervened in the case on the ground that the terms of the Florida inspection fee reduced the reciprocal advantages granted under the Belgo-Luxemberg trade treaty of 1935, whereby this country granted a 1½-c. per 100-lb. tariff reduction on Belgian and other cements in return for which those countries granted valuable customs reductions on industrial and agricultural products of the United States.

Marquette Will Rebuild Cape Girardeau Plant

A two-year program, to begin early in the Spring, involving the renovation and rebuilding of the major part of the Cape Girardeau plant of the Marquette Cement Mfg. Co., has been announced by W. A. Wecker, president.

"This does not mean enlargement of the plant, but merely replacement of equipment rendered obsolete by exacting demands of the present and future," said Mr. Wecker.

Fire originating in the boiler room Dec. 8 destroyed the plant of the Kentucky Concrete Pipe Co., Louisville, Ky., causing a loss of $35,000 which was partly covered by insurance.

A.S.T.M. Committee C-1 on Cement Meets

SEVERAL REVISIONS APPROVED

The fall meeting of Committee C-1 on Cement of the American Society for Testing Materials was held Nov. 5 at the National Bureau of Standards in Washington, D. C.

Several actions affecting standards were approved at the meeting and, subject to favorable letter ballot, will be referred to the Society. Action was taken to recommend the adoption as standard of the two present tentative methods for rapid determination of magnesia, with suitable editorial changes. (Section 1, 2, 3 and 4 of Tentative Method of Chemical Analysis of Portland Cement, C114-37T). (In case of dispute the results obtained according to section 16 of the Methods of Samping and Testing Portland Cement, C77-37 are to govern.) It was decided to retain as tentative the methods for determining manganese and phosphorus (Sections 5, 6, 7 and 8 of C114-37T). Two proposed tentative methods were reviewed and the committee plans to recommend their publication as tentative by the Society; these cover the determination of potassium and sodium oxides in Portland cement and a procedure for determining water-soluble alkali in Portland cement.

Another important decision reached at the meeting was to recommend the deletion of the fineness requirement from the Standard Specifications for High-Early-Strength Portland Cement (C74-36).

Other subjects of interest were discussed although no action taken by the meeting affected the present standards. A detailed report related the results of the very recent study of the possibilities of pebble mortars—"miniature concrete"—in 2-in. cubes. Three mixes were studied by 14 laboratories, using three cements.

A large number of laboratories had participated in the comparative tests on which are based the recommendations relating to chemical methods. The results of this work were discussed, and also the program for the investigation of methods for determining free lime in Portland cement, which tests are about to be started. A progress report outlined the results of the study now being made of the data accumulated in the recently undertaken investigation of the autoclave test by a group of coöperating laboratories.

A number of other important projects were discussed at considerable length and it is expected that the subcommittees involved will submit reports in advance of the Spring Meeting, at which action may be taken. Questions included a proposed revision of masonry cement specifications (C91-32T) and the development of specific requirements for slag cements and blended cements. The discussion of fineness resulted in assigning to one of the subcommittees the study of the possibilities of a "bleeding" test for cement.

New Jersey Diversion Defeats Own Purpose

Like the noblewoman who went to the opera and wept over the disappointments of the heroine, during which time the lady's coachman froze to death outside in the bitter cold, the New Jersey legislature has diverted $80,000,000 of automotive tax funds to relief and other "humanitarian" purposes, with the result that the roads have been neglected and highway deaths have shown an appalling increase.

The state's motor accident toll, according to E. Donald Sterner, state highway commissioner, has jumped to four killed and 24 maimed daily, compared with three deaths and 18 injured daily a year ago.

Out of $37,000,000 collected in gasoline taxes and registration fees in 1936 from New Jersey's motorists, only $1,250,000 was available for highway construction work, said Mr. Sterner. With automotive tax collections at about $40,000,000 in 1937, only about $5,000,000 will be available for new construction, he said.

Declaring that the state's traffic problem is "the worst in the world," Mr. Sterner said that even the most modern arteries in New Jersey are carrying peak loads of three to six times their safe traffic burden.

"Nowhere else in the world are two such large centers of population as New York and Philadelphia so short a distance apart, and all this interurban traffic moves through New Jersey.

Although the saturation point on the standard four-lane highway is 14,000 cars a day, more than 45,000 cars are using daily the four-lane route, which feeds the Holland Tunnel, he said.

Pacific Coast engineers are interested in a recently-completed experimental roadway which was opened to traffic a few weeks ago near Redwood City, Cal. The road was constructed of cement-bound shale and was sponsored by the Portland Cement Assn.

Saeger Chief Chemist at New Cement Plant

IS WELL KNOWN IN INDUSTRY

Appointment of Geoff A. Saeger as chief chemist for the Gulf Portland Cement Co., Houston, Tex., has been announced by Kent B. Diehl, president of the firm. He leaves a position high in the cement section, U. S. Bureau of Mines, to take charge of the chemistry division for the Houston concern.

Geoff A. Saeger

Mr. Saeger is well known in the cement industry, having held important posts with a number of the larger plants prior to his connection with the Bureau of Mines at Washington. Formerly he was chief chemist for the Lehigh Portland Cement Co.; chief chemist of the Bessemer Limestone & Cement Co.; superintendent of the Green Bag Cement Co.; and superintendent of the Kansas City plant of the Missouri Portland Cement Co. He is now a member of Committee C-1 on Cement of the American Society for Testing Materials.

The Gulf Portland Cement Co. is the only new cement plant to be erected in the United States during the year 1937. Involving an expenditure of more than $500,000, the new plant is said to employ modern equipment and processes.

Kent B. Diehl, president and general manager of the Gulf company, has been connected with the industry for more than 20 years. Starting as a cement salesman while in college, he worked as special engineer, field engineer, salesman and supervisor of plant construction for some of the larger cement manufacturers.

Two Mississippi Plants Tax Exempt for Decade

Plants of the Watson Sand & Gravel Co. completed Nov. 1 at Fluker, La., at a cost of $41,250, and Shreveport Superock Products Co., Inc., near completion, at Shreveport, La., were among the 25 listed Dec. 2 by Gov. Richard Leche of Louisiana as eligible for a 10-year tax exemption. A recent legislature provided for the exemption from property taxes for a 10-year period all new industrial plants or additions.

Ray Hulsart, Atlas Official, Dies at 54

NOTED WAR HERO AND ENGINEER

C. Raymond Hulsart, 54, World War hero and vice-president of the Atlas Lumnite Cement Co., died Nov. 30 at New Rochelle, N. Y., of heart disease.

It was exactly twenty years after the famous morning brawl he and his engineers staged on the Cambrai front when, armed only with picks and shovels, they repulsed an attack by armed Germans who had broken through the British lines.

At the time Mr. Hulsart was captain of Co. B. 11th Engineers, of the New York National Guard, serving with the British, whose attack of a few days before apparently had disorganized the enemy. The Germans, however, staged a counter-attack and broke through, reaching the engineers' working party putting in reserve wire and earthworks.

Captain Hulsart led his men in a pick-and-shovel scrimmage against bayonets at close quarters, each man arming himself with a rifle as quickly as he could knock a German out.

The British decorated their American allies after the German attack had been rolled back and Capt. Hulsart became a major. He and his men also received American decorations for the same fight.

Major Hulsart returned to civil engineering after the war and had been vice-president of the Atlas Lumnite Co. for the last 16 years. He was a member of the Engineers Club of New York and the American Society of Civil Engineers.

22,000 Miles U.S. Roads Completed During 1937

More than 22,000 miles of all classes of highway were brought to completion in the fiscal year 1937, according to the annual report of the Bureau of Public Roads of the U. S. Department of Agriculture. This mileage, completed under Bureau supervision, exceeded by several hundred miles the work completed in the previous year and also the record of 21,700 miles completed in 1934.

Grade-crossing elimination and protection work in 1937 far surpassed that of any other year. There were 1,149 crossings eliminated, of which 1,086 were financed under the $200,000,000 grade-crossing program authorized by the Emergency Relief Appropriation Act of 1935. Also, 196 existing grade-separation structures were reconstructed and 574 crossings were protected by signals or other safety devices.

Of the completed mileage, 18,768 miles were constructed with funds apportioned to the states according to formulas prescribed by law and the work was done in coöperation with state highway departments. This work included 10,257 miles on the Federal-aid system outside of municipalities, 1,093 miles of extensions of the system into and through municipalities, 571 miles of secondary roads in municipalities, and 6,847 miles of secondary roads outside of municipalities. Federal funds involved in the respective classes of work, including that at grade crossings, were $155,281,958, $59,688,908, $27,380,225, and $77,281,776.

Roads under contract at the end of the year totaled 11,274 miles and involved $268,445,582 of Federal funds; and there were 2,074 miles approved but not yet contracted for involving $36,542,365 of Federal funds. Unobligated balances available for new work totaled $232,053,608, in large part newly apportioned funds for the fiscal year 1938.

Kansas Governor Scores Gasoline-Tax Evasions

Declaring that most of the state funds for highway improvement and maintenance in Kansas are derived from the gasoline tax, Governor Walter A. Huxman entered a plea for the coöperation of all citizens to enforce the state gas tax law in an "equitable, fair manner" in a radio address delivered from Topeka Nov. 7.

The governor indicated a threat to the state's road program was present as sales of tax-exempt gasoline were increasing more rapidly than total sales of the fuel.

"We are losing a large amount of federal aid money for our roads because our state funds are so limited that we cannot match federal aid money," Governor Huxman said.

Exemptions from the gasoline tax law, he added, have mounted from 16 per cent. of the fuel sold in 1930 to 28.5 per cent. in 1936.

Basic Ores, Inc., recently resumed mining operations at its brucite deposit near Luning, Nev. The product, used extensively in the manufacture of fire brick, furnace linings and similar products, is shipped by rail to Cleveland, Ohio.

Plan Cement Plant at Juarez on Rio Grande

ACROSS BORDER FROM EL PASO

Plans are said to be under way for the establishment of a small cement plant at Ciudad Juarez, just across the Mexican border from El Paso, Tex. Large supplies of clay and limestone are available in the vicinity of the proposed plant—in fact, the raw materials available on the Mexican side of the Rio Grande are believed to be identical with those on the Texas side of the river now being utilized by the El Paso plant of the Southwestern Portland Cement Co. In addition to the manufacture of cement, the Mexican concern hopes to supply concrete mixed and ready for use on nearby construction jobs.

Jesus R. Silva of Juarez, is responsible for the undertaking. The proposal is to establish a small local cement plant, using gas as fuel, capable of producing about 250 bbl. of cement daily, the U. S. Bureau of Mines reports.

New Graphite Plant in Tennessee Ready Feb. 1

A new firm, Graphite Corp., has begun construction of a new graphite plant at Shelbyville, Tenn., which it plans to complete by Feb. 15.

Officers of the company are Frank H. Beck, president; A. C. Jenson, vice-president and general manager; W. B. Woosley, treasurer; and Sam Linton, Jr., secretary.

Mines Demand Keeping Auburn Lime Co. Busy

Demand for lime in the cyanide process of gold recovery is keeping the plant of the Auburn Chemical Lime Co., Auburn, Cal., busy this winter.

The plant has been operating at capacity for several months, the quarry working 8 hours with the plant in service 24 hours a day.

New Firm Will Develop Volcanic-Ash Deposits

The Volcanic Products Corp. was recently organized to develop extensive deposits of inert volcanic ash near Millican, Tex., located on the Southern Pacific Railway in Grimes County.

The company plans to install equipment at the mine to grind, air-float and package the product.

Construction Reverses Recent Lower Trend

VOLUME IS ENCOURAGING

The volume of public expenditures for construction projects undertaken in November in the 37 eastern states increased 20 per cent. when compared with October and 4 per cent. compared with November of last year. This record, as reported by F. W. Dodge Corp., represents a reversal of the declining trend of public-financed construction which has been in effect since last July. On the other hand, privately-financed construction during November declined 15 per cent. from the October level which is somewhat more than seasonal. Total contracts including both public and private work amounted to $198,464,600 for November which was 2 per cent. below the October total and 5 per cent. below November of last year.

New contracts for the New York World's Fair were not responsible for the increased amount of public work which was reported. In fact, the World's Fair contracts accounted for only $599,800 of the November total. However, this project will have greater influence upon future contract totals since only $11,550,500 of the estimated total has been awarded to date.

Total contracts for the first eleven months of 1937 amounted to $2,703,672,400 as compared with $2,475,600,300 for the corresponding eleven months of last year, representing a gain of 9 per cent. When segregated by classes of construction, this gain amounted to 17 per cent. for residential building, 19 per cent. for non-residential building and 38 per cent. for public utilities. Construction of public works during this period declined 20 per cent.

Philippines Cement Co. Trebles Plant Capacity

The Rizal Cement Co. of Manila, P. I., a subsidiary of Madrigal & Co., is reported to have placed orders for machinery and equipment for the manufacture of cement. The new addition will have a capacity of 2,000 bbl. a day, which will nearly treble the present capacity of 1,200 bbl. The company is now working at capacity, due to the exceptional building activity throughout the province. It is estimated to have produced close to 200,000 bbl. for the 1937 half-year, making a total production for the Philippine Islands for the half-year of 475,000 bbl.

The new machinery is expected to arrive about the beginning of 1938 and to be installed ready for operation after the rainy season. It does not appear probable that there will be sufficient demand for cement to require the operation of the new plant at capacity, according to the U. S. Bureau of Mines.

Hermitage Acquires New Clinker-Grinding Mill

The Allis-Chalmers Manufacturing Co., Milwaukee, Wis., recently concluded a contract with the Hermitage Portland Cement Co., Nashville, Tenn., covering a 9-ft. by 6-in. and 8-ft. by 10-ft. clinker-grinding preliminator with a charge of forged steel balls. A 400-h.p. synchronous motor was also included in the order. The contract amounted to around $33,000. This new clinker-grinding mill will augment present grinding equipment and will have an hourly capacity of approximately 175 bbl. of clinker.

Lightweight Aggregates Popular on West Coast

The Diatomaceous Earth Co., is rebuilding its old "float-stone" plant near Walteria, Cal., and in the future will concentrate on the production of its new lightweight aggregate known as Diacrete rather than raw and refined earths, according to R. B. Sage, superintendent.

The kiln has been rebuilt and new storage bins are being erected as part of the program. The Walteria plant recently supplied the lightweight aggregate for use in constructing the tower on the new Coca-Cola Building in Los Angeles. A similar lightweight aggregate was used in paving the floor of the Golden Gate Bridge at San Francisco.

Colorado Fuel Resumes Quarrying at Soda Point

The Colorado Fuel & Iron Corp. silica quarry at Soda Point, Colo., which was closed down early in November was reöpened late in December to furnish silica for operations at the corporation's Pueblo, Colo., steel mill. T. J. Quinn is superintendent of the quarry.

Fire Causes Damage at Pipe Plant in Houston

Texas Concrete Pipe Co., Houston, Tex., sustained a loss of $3,000 Nov. 25 when fire, due to faulty wiring, damaged machinery and concrete pipe in the plant.

Court Ruling Sought on Compensation Act

PENNSYLVANIA BENEFITS RAISED

A constitutional test of Pennsylvania's new workmen's compensation act, which became effective Jan. 1, 1938, has been instituted at Harrisburg. It was filed on behalf of two companies by William A. Schnader, attorney-general in the second Pinchot administration, and is directed against Ralph M. Bashore, secretary of labor and industry.

The petition charges that the new law, which would broaden the employer's liability for diseases and infections resulting from hurts, would increase the cost of insurance, that the law would make employers liable for injuries received elsewhere than on their own property, that they would be liable for an injured employe not working in accordance with the law, that compensation would be allowed in excess of wages received by many workers and that the compensation board could arbitrarily say what the future earnings of the injured shall be.

Besides allowing benefits for occupational diseases, the new compensation system would increase the maximum benefits from $15 to $18 a week, and minimum payments for disability would be raised from $7 to $12. Employers are also required to shoulder the cost of administration.

Locomotive-Type Shovel Replaced by Crawler Job

A Marion Model 37 steam shovel has been installed in the quarry of the Midwest Rock Products Co. at Ridgeville, Ind. The new excavator, mounted on crawlers, replaces a locomotive-type shovel which had seen many years of service.

WPA Builds Highway to Calaveras Cement Plant

A seven-mile concrete highway is being constructed by W.P.A. forces from San Andreas, Cal., to the plant of the Calaveras Cement Co. Three bridges will be included in the project, one spanning the Calaveras River.

Illinois Plant Razed by Fire Will be Rebuilt

Fire caused $50,000 damage recently when it destroyed the concrete-products plant of M. Kammerer & Sons at El Paso, Ill. The loss was said to have been covered by insurance and the plant will be rebuilt shortly.

Cement-Price Trend Down Over 20 Years

UNIVERSAL ATLAS HEAD SPEAKS

In a radio round-table discussion, sponsored by the National Broadcasting Co. and the Chicago Assn. of Commerce, Blaine S. Smith, president of the Universal Atlas Cement Co. and other building-material leaders of Chicago discussed the costs of building and the need for home-building over the air recently. Excerpts from Mr. Smith's part in the discussion were as follows:

"Building-material prices have gone up, of course, because costs have risen but they have not advanced as much as prices have in other fields. As far as cement is concerned, the price trend for fifteen or twenty years has been downward. We now obtain only 75 per cent. of the 1920 price; in other words the price today is 25 per cent. less than it was in 1920.

"Nearly all building materials move in a direct channel from manufacturer to dealer to consumer. In our industry, for example, there never is more than one middleman between the manufacturer and the user of cement. He is the building-material dealer. He performs an important service in the distribution of the product. There are no jobbers, wholesalers, or other middlemen. Dealers buy the cement in carload lots, warehouse it, deliver it to their local trade as needed, and render whatever other service is needed for cement users. These neighborhood dealers are the service men of the building-material industry. Cost of distribution is reduced by this simple marketing plan, and people in every neighborhood can secure building materials in large or small quantities, on short notice and at reasonable prices.

"Without cement, the cost of many of our big building projects would be prohibitive. If all of the cement now in use in Chicago suddenly were removed from the concrete in its structures, the caissons upon which large buildings rest would crumble, and the buildings themselves would collapse. The lives of workers, shoppers, and school children would be endangered. Streets and sidewalks would become almost impassable. The water-supply and sewer systems would cease to function, and trains and street cars would stop. But concrete does not disintegrate. It is permanent. It grows stronger with age. It is used but not consumed. Many years from now people still will enjoy the benefits made possible today by cement. Even in the foundation of the small home, cement gives permanent strength at lower cost. Compare the low priced, everlasting, one-piece concrete foundations of today with the old-time foundations of early Chicago. Today's home has a stronger, more durable foundation at a fraction of the cost."

Construction Industry Believed in Newer Era

The construction industry is not in a state of crisis and is not even sick but is merely the victim of headline hysteria, hypochondria and too many doctors, said Thomas S. Holden, vice-president in charge of statistics and research, F. W. Dodge Corp., in discussing the future of building before the December meeting of the New York chapter, American Statistical Assn. He predicted that the industry would recover "without the application of artificial stimulants," unless deep recession sets in.

Declaring that the day of old-time home-building booms had passed, along with railroad building and other phenomena marking our country's youth, he pointed out that construction demand, beyond ordinary repairs and replacements, must come from new needs.

Installs Diesel Power at Arkansas Plant

D. G. Hill & Co., which recently purchased the plant of the Energy Gravel Co., at Keener, Ark., is making extensive improvements. Headlining the list is the installation of a Fairbanks-Morse Diesel engine which will drive the generator supplying electric power.

Marketers of Oil Urge Lower Gasoline Taxes

A reduction of 1c. in the 5c. Nebraska state gasoline tax, repeal of the Federal gasoline tax, and repeal of the Federal tax on lubricating oils were asked in resolutions passed by the Nebraska Petroleum Marketers, Inc., at Omaha, Dec. 9. The association also opposed the diversion of gas tax to purposes other than highway maintenance and construction.

The Atlas Olympia Co. is making winter shipments over the Southern Pacific R.R. of aggregates to be used in constructing the huge new Pacific Coast plant of the Continental Can Co. at Stockton, Cal.

How a Gravel Company Reduced Its Accidents

PLAN TOLD AT SAFETY CONGRESS

It's bad enough when a state compensation commission makes uncomplimentary remarks about the frequency of a company's industrial accidents, but when the insurance companies refuse to continue insurance, it's time to do something about safety.

Goaded by such an unfortunate situation, the Lyman-Richey Sand & Gravel Corp., of Omaha, Neb., instituted its safety drive with such telling effect that the campaign not only paid handsome dividends through cash savings but earned the company the National Safety Award as well.

Delegates to the quarry section of the recent National Safety Congress at Kansas City were regaled with the story of how this firm planned and executed its safety campaign in the address of H. A. Koop, safety director of the company.

Twenty-two separate plants, located throughout Nebraska, are managed from the Omaha general office, and each plant was supposed to establish its own safety rules and conduct its own campaign, Mr. Koop related.

However, when the records showed the discouraging figures of 79 lost-time accidents in 163,275 man-hours of exposure, company officials decided the system was not practical, so adopted another plan, starting off with the appointment of a veteran employee, well versed in all plant operations, as safety director, devoting his full time to safety work.

Employees were required to pass physical examinations, every possible accident hazard in and around machinery and equipment was removed; meetings of foremen were held to discuss safety conditions and plan the campaign; trophies and cash bonuses were awarded to foremen whose plants had the best safety record; first-aid kits were provided and bulletin boards and posters were used further to educate workmen in cultivating good safety habits.

"Slowly but surely," Mr. Koop said, "we are making progress toward our goal of a no-lost-time-accident record for all our plants. Considering the decreasing number of accidents reported with the increasing efficiency in operations, we come to but one conclusion: Safety does pay."

National Crushed Stone Assn.
National Lime Assn.
National Slag Assn.
Portland Cement Assn.

WITH THE TRADE ASSOCIATIONS

National Sand & Gravel Assn.
National Industrial Sand Assn.
National Ready Mixed Concrete Assn.

JANUARY, 1938

Interesting Sessions for Ready-Mix Meeting

The program for the eighth annual convention of the National Ready Mixed Concrete Assn. to be held at the Netherland Plaza Hotel in Cincinnati the week of January 31, is rapidly becoming crystallized. That convention is to be held concurrently with the twenty-second annual convention of the National Sand & Gravel Assn. and a number of joint as well as independent sessions will be held. The joint sessions will deal with those subjects of mutual interest to ready-mixed-concrete producers and sand-and-gravel producers. These topics include: labor relations, business conditions, prospects for future business, legislation affecting industry, and enginering subjects dealing with the general question of concrete.

Among the engineering subjects to be discussed are:

(1) Reports of the Technical Problems Committee and the Committee on Standards. The latter will deal particularly with standards for truck mixers.

(2) A paper discussing the status of present-day knowledge of concrete, what useful facts have been developed by research, and what are the phases of this most important construction material on which information is most needed.

(3) The design and control of concrete mixtures will be covered in an authoritative paper. There is much need to correlate and clarify some of the conflicting theories as to the best methods for designing concrete. Particular attention will be paid to the effect of aggregates.

(4) Lime-putty has aroused much interest in the industry and a number of producers have fitted that business in with their ready-mixed-concrete business. A paper on the subject will be presented by an authority.

(5) Developing markets for ready-mixed concrete, merchandising and servicing problems and the like will occupy prominent places on the program.

Coming Events

January 17-18, 1938, San Antonio, Tex. — Annual convention, American Concrete Pipe Assn., Plaza Hotel.

January 17-22, 1938, Cleveland, Ohio. — Annual Road Show, American Road Builders' Assn., Cleveland Auditorium.

January 24-26, 1938, Cincinnati, Ohio. — Twenty-first annual convention and machinery exhibition, National Crushed Stone Assn., Netherland Plaza Hotel.

January 31-February 3, 1938, Cincinnati, Ohio—Twenty-second annual convention and machinery exhibition, National Sand & Gravel Assn., Netherland Plaza Hotel.

February 1-3, 1938, Cincinnati, Ohio. — Annual convention and machinery exhibition, National Ready Mixed Concrete Assn., Netherland Plaza Hotel.

February 7-8, 1938, Chicago, Ill. — Annual convention, Cast Stone Institute, Medinah Athletic Club.

February 8-11, 1938, Chicago, Ill. — Annual convention and machinery exhibit, American Concrete Contractors' Assn. and National Concrete Masonry Assn., Sherman Hotel.

February 14-16, 1938, Cleveland, O. — Annual convention, Sand Lime Brick Assn., Statler Hotel.

February 22-25, 1938, Wichita, Kan. — Annual Southwest Road Show and School, Auditorium.

March 17, 1938, San Francisco, Cal. — Convention, Assn. of Rock, Sand and Gravel Producers of Northern California.

Five Concrete Groups to Convene Feb. 7 to 11

Instigated by the success of holding their conventions jointly last January, concrete contractors and concrete products manufacturers have announced plans to hold their 1938 conferences together in Chicago, during the week of February 7. Participating organizations will be the American Concrete Contractors Assn., National Concrete Masonry Assn., National Cinder Concrete Products Assn., and the Cast Stone Institute.

In conjunction with the conventions, a much enlarged Concrete Industries Exposition is to be staged with manufacturers showing the newest machinery and equipment for concrete work.

At the close of the first joint convention last January, concrete men generally agreed that the combined meetings provided a long needed opportunity to discuss important merchandising and construction problems that are common to the closely related groups. Concrete contractors and concrete products manufacturers were able to secure information on new developments not only in their own but in both branches of the concrete industry, developments which in many instances they would incorporate profitably in their individual work. Recognition of these advantages resulted in a repetition of the combined sessions in 1938.

To provide a better opportunity for members of each group to attend meetings of other groups, the convention committees have added an extra day to their 1938 conventions so that concrete-contractor sessions can be held each morning and concrete masonry meetings each afternoon.

Important to concrete contractors will be their confab to form a permanent concrete-contractors' organization. At the close of their first national conference last January, attended by more than 400 contractors from various states, an organization committee was selected to study the possibilities of such an organization, and a tentative name, the American Concrete Contractors Assn. was chosen. The recommendations of the committee, to

be presented by Chairman Bert Carey of Forest Park, Ill., will start the organization of the new body.

Although programs are not complete, the convention committees report that specialists in merchandising, manufacturing and construction are being engaged to present new developments in their fields. In addition, a greater number of demonstrations are being planned to illustrate approved methods of construction.

The five events to be held simultaneously are:

1. *Second National Conference of the American Concrete Contractors Assn. (Feb. 8-11. Hotel Sherman.)* New selling methods, innovations in concrete construction, analysis of markets, developments in reinforced concrete house construction.

2. *National Concrete Masonry Assn. (Feb. 8-11. Hotel Sherman.)* Manufacturing problems, special units, concrete floors, the back-up market, more effective selling, analysis of markets.

3. *National Cinder Concrete Products Assn. (Feb. 8-11. Hotel Sherman.)* Improved manufacture of cinder units, manufacturing problems, selling methods.

4. *The Cast Stone Institute. (Feb. 7, 8. Medinah Athletic Club.)* New practices in manufacturing and selling.

5. *Concrete Industries Exposition. (Feb. 8-11. Hotel Sherman.)* An enlarged exhibit of machinery, materials and equipment used in the making of concrete and concrete products.

Lime-Putty Producers to Meet at Cincinnati

The Lime Putty Products Assn. will hold its second annual meeting at the Netherland Plaza Hotel in Cincinnati, O., on Feb. 1, 1938. Members of the National Sand & Gravel Assn. and the National Ready Mixed Concrete Assn. in attendance at their respective conventions at that time and others interested in the production and distribution of aged lime-putty are invited to attend.

The Lime Putty Products Assn. was organized by the operators of Brooks-Taylor lime-putty plants at a meeting in Washington, D. C. on March 30 and 31, 1937. At that meeting the following officers were elected: President: Irving Warner, vice-president of the Warner Co. Philadelphia, Pa. Vice-presidents: E. S. Simpson, president of the Super-Concrete Corp., Washington, D. C. and Durando Miller, vice-president of the Colonial Sand & Stone Co., New York, N. Y. Secretary-treasurer: Hayden Brooks, Standard Building Materials Co., Birmingham, Ala.

The meeting will be held in the evening, starting with a dinner at 7 o'clock. The program will include the following talks:

Lee Trainor, chief engineer, construction department, National Lime Assn.: *The Proper Use of Lime Putty in Brick Mortar;* John C. Best, president, Best Brothers Keene's Cement Co.,: *Lime Plaster;* Milo E. Smith, advertising manager, Chicago Bridge & Iron Co.: *Keep Selling — Don't Coast.*

Norman Hough, former head of the National Lime Assn. and at present with the Richter Concrete Corp., Cincinnati, O., will present a paper at the afternoon session of the National Ready Mixed Concrete Assn. on Feb. 1 outlining how lime-putty plants fit into the operation of the ready-mixed-concrete industry.

Sand-Lime-Brick Men Gather Feb. 14 to 16

Members of the Sand Lime Brick Assn. will gather at the Statler Hotel in Cleveland, O., on February 14, 15 and 16 for their annual convention.

Announcement of the dates and place of the gathering were made Dec. 9 by J. Morley Zander, secretary-treasurer of the Saginaw Brick Co., Saginaw, Mich., who is secretary of the association.

Correction

In reporting the death of Frank Sugg at the Springfield, Mo., quarry of the Marblehead Lime Co., PIT AND QUARRY in its December issue referred to him as an employee. According to Bernard L. McNulty, president of the company, Sugg was not an employee. While intoxicated, the man is believed to have climbed a wall which protects the quarry and to have fallen from the ledge. Discovered the next morning by the quarry superintendent, who notified the police, he was removed to a hospital where he died.

Quarry Group Works Five Accident-Free Years

Employees of Krause Quarry No. 1 of the Columbia Quarry Co., St. Louis, Mo., gathered for a group photograph at the plant recently. Twice winner of the National Crushed Stone Assn. safety contest and recipient of the Joseph A. Holmes Safety Award, this group leads all others in the quarrying industry for working safely, having completed five full years without a lost-time accident on September 22, 1937. Once each month the workmen gather for a safety mass meeting and, on their record, the men put into practice the things that they learn.

EDITORIAL

His Master's Voice

ADVERTISING has been one of the most useful tools ever adopted by business. In this country, where its use has been greatest and the technique involved in its utilization has been most highly developed, it has made of its readers the world's largest mass of buyers of advertised goods. No better evidence of its effectiveness in furthering the objectives of its users could be found. It has served business as few other tools have done, and has been so responsive to the demands of business, so closely attuned to its needs, so ready to serve it in new ways, that it has well earned the nickname of "His Master's Voice". To many people advertising appears not only as the symbol of business but as synonymous with business. It is probably true that most people's knowledge of business begins with, is conditioned by, or is limited to the impressions which they derive from advertising. That these impressions are not always what the users of advertising may wish them to be is to be attributed not to the principles of advertising, nor to the technique of those who develop campaigns or write copy, but to the owner of the voice which has caught the buyer's ear.

We believe it to be true that most persons who complain of the dishonesty of business, and especially of "big" business, have arrived at their opinions through the reading of advertising rather than through actual business transactions in which they feel they have been shabbily treated. Few buyers are in a position to judge the quality of what they buy or to know whether it is properly priced. They have come to rely, therefore, largely, if not entirely, on the impressions of sincere intention, honest representation, and fair dealing on the part of the advertiser which his advertising gives them. They have no means of verifying his claims before purchase, no laboratories in which his products can be tested at fees within their reach, no independent consultants to whom they can apply for counsel. Buyers are forced to depend on the guinea-pig method of investigation, in which they themselves become the testers, the subjects on which the tests are made, and the ones who pay the costs of the trials.

Perhaps this is as it should be, or even as it must inevitably be, but these conditions have combined to focus attention more intently on advertising, which is the initial point of contact between the seller and the buyer. If the buyer finds what he interprets as misrepresentation, deceit, or dishonesty in this introductory stage of a contemplated transaction, what, he may well (and actually does) ask himself, may he expect to encounter in subsequent stages. And when he learns, as he often does learn from after-purchase experience, that there was misrepresentation, deceit and dishonesty in the initial stage even though, because of artful concealment, he could not discern it, he becomes mistrustful of all advertising. To many thousands of such buyers all the "voices" sound falsetto and all the "masters" are suspect. Business can not expect to expand its sales continuously when it allows mistrust on such a scale to settle into deep conviction. It would be not alone interesting, but helpfully instructive, if business men could know how much of their "poor" business and "receding" business is due to the spread of this conviction.

THEY may never know, but many of them are beginning to suspect, and some of them, who are inclined to be more bold in self-criticism than most of their fellows, are pointing their finger at advertising, at the chief tool of their daily task, at the very technical and psychological skill that has made of advertising a great power in business. They are clamoring for reforms, for higher standards, for newer and fresher ideals, and with all the fervor of socially-minded legislators and consumer-elected advocates. They are calling for notes of greater fidelity in the "voices" and for tones of greater basic soundness in the "masters". Let us hear what some of them have to say.

"Unless there is speedy improvement in the tone of advertising, the field is going to see the passage of food and drug amendments and a law clamping regulation on copy as it has never dreamed of. We can't stop it, and many wise men don't want to stop it."—Uttered not by a crack-brained reformer, trained in law and politics and ignorant of the needs of business, but by John Benson, president of the American Association of Advertising Agencies, who sees advertising fallen into disrepute because of its continued use of cheap and dishonest appeals.

"We think you will agree with us in feeling that close coöperation to stop unfair or disreputable advertising is a very timely suggestion. Present-day attacks on business include an increasing number of attacks on advertising. While we know that the bulk of advertising is decent,

one bad piece of copy will furnish the text for many onslaughts, which reflect upon the integrity of advertising as an institution."—Said by no professional agitator but by the Advisory Committee on Advertising of the Proprietary Association in a letter to the American Newspaper Publishers' Association discussing voluntary censorship of advertising.

"IT is unsound and unprofessional for the advertising agency to prepare or handle any advertising of an untruthful or indecent character, as exemplified by the following copy practices:

"1. False statements or misleading exaggerations.

"2. Indirect misrepresentation of a product, or service, through distortion of details, or of their true perspective, either editorially or pictorially.

"3. Statements or suggestions offensive to public decency.

"4. Statements which tend to undermine an industry by attributing to its products generally faults and weaknesses true only of a few.

"5. Price claims that are misleading.

"6. Pseudo-scientific advertising, including claims insufficiently supported by accepted authority, or that distort the true meaning or practicable application of a statement made by professional or scientific authority.

"7. Testimonials which do not reflect the real choice of a competent witness."—Not the provisions of a proposed Federal code, but the one adopted jointly last November by the Association of National Advertisers, the American Association of Advertising Agencies, and the Advertising Federation of America.

"In no activity of business are high standards of business conduct more essential than in advertising. If advertising is to perform its true function, purchasers must have confidence in the presentations made by advertising; such confidence can be created only through experiences of buyers of the articles or services advertised. There must be truth in statement and in implication—no promises can be made which are not fulfilled. Even unconscious deviations from these standards dissipate confidence. Lack of honesty and truth inevitably breaks confidence and defeats the only function of advertising in its modern application. Any departures from fairness and anything misleading, however unintentional, can result only in placing obstacles the way of orderly distribution processes. The improper use of advertising results in the loss of its effectiveness for legitimate use by honest merchants, distributors and manufacturers."—Strong enough to please almost any radical hater of business, but merely the sober opening statement of a report of the Domestic Distribution Department of the United States Chamber of Commerce, entitled *The Service of Advertising*.

Sound principles are these, in our opinion, and deserving of the most serious consideration, since they come from the inside, even though they may, and probably do, represent fear reactions aroused by the increasing threats of government interference and control. Nevertheless, they often show a true recognition of a situation that must be changed, if business is to regain even a small part of the public confidence it has lost in the highly-competitive conditions of recent years. Nor is it enough to say complacently that the majority of business men are honest, when the public accepts the misdeeds, the bad practices, of the minority as the behavior-pattern of business as a whole. The erring part of society is always the small part; it is only the publicity given to its deviations from normal, social conduct that gives the stigma of guilt to the mass.

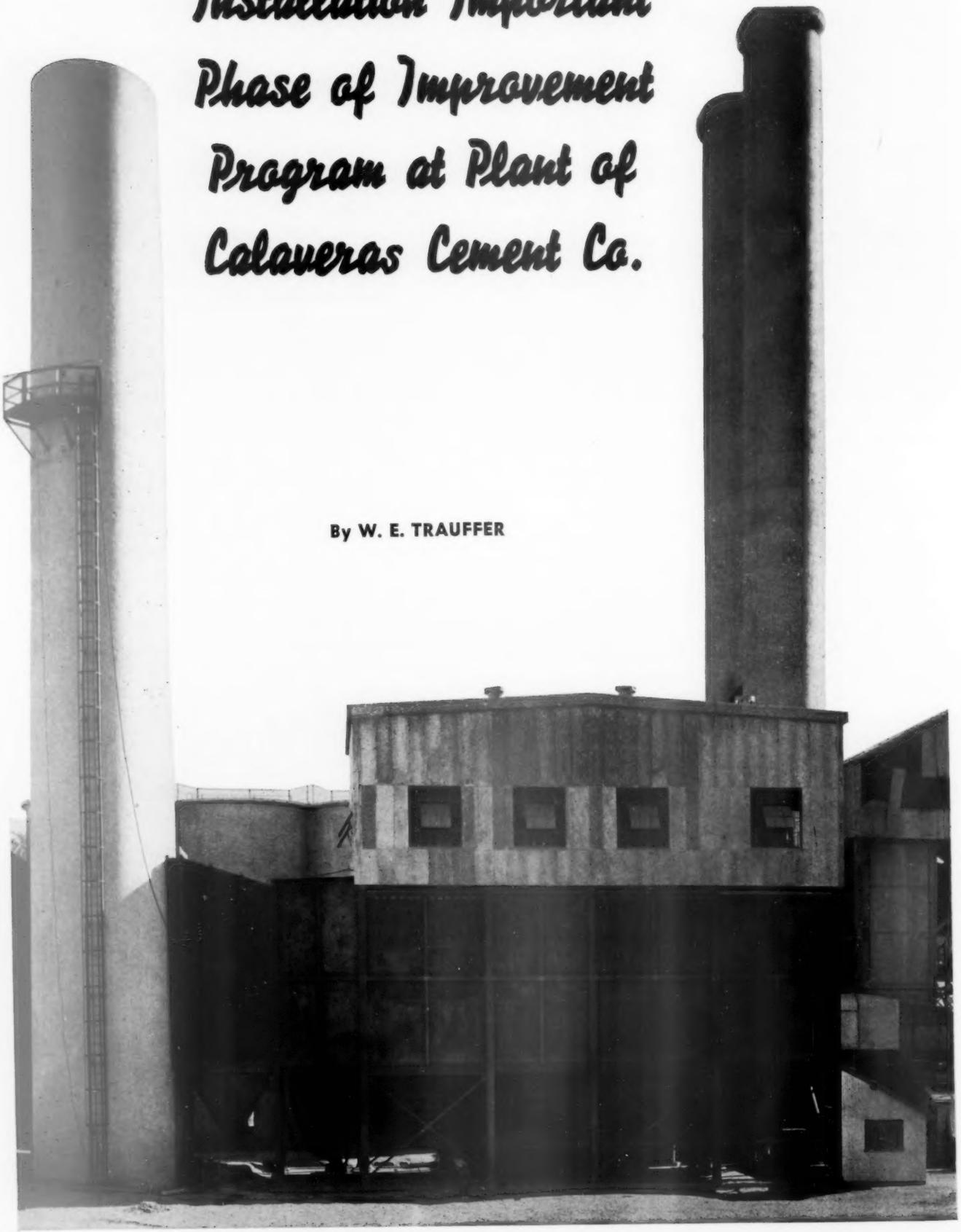
Even some of these inside critics recognize and are willing to face the realities. Listen to Henry Eckhardt, New York advertising agent and chairman of the board of the American Association of Advertising Agencies, speaking before the Western Council of the Four A's two months ago:

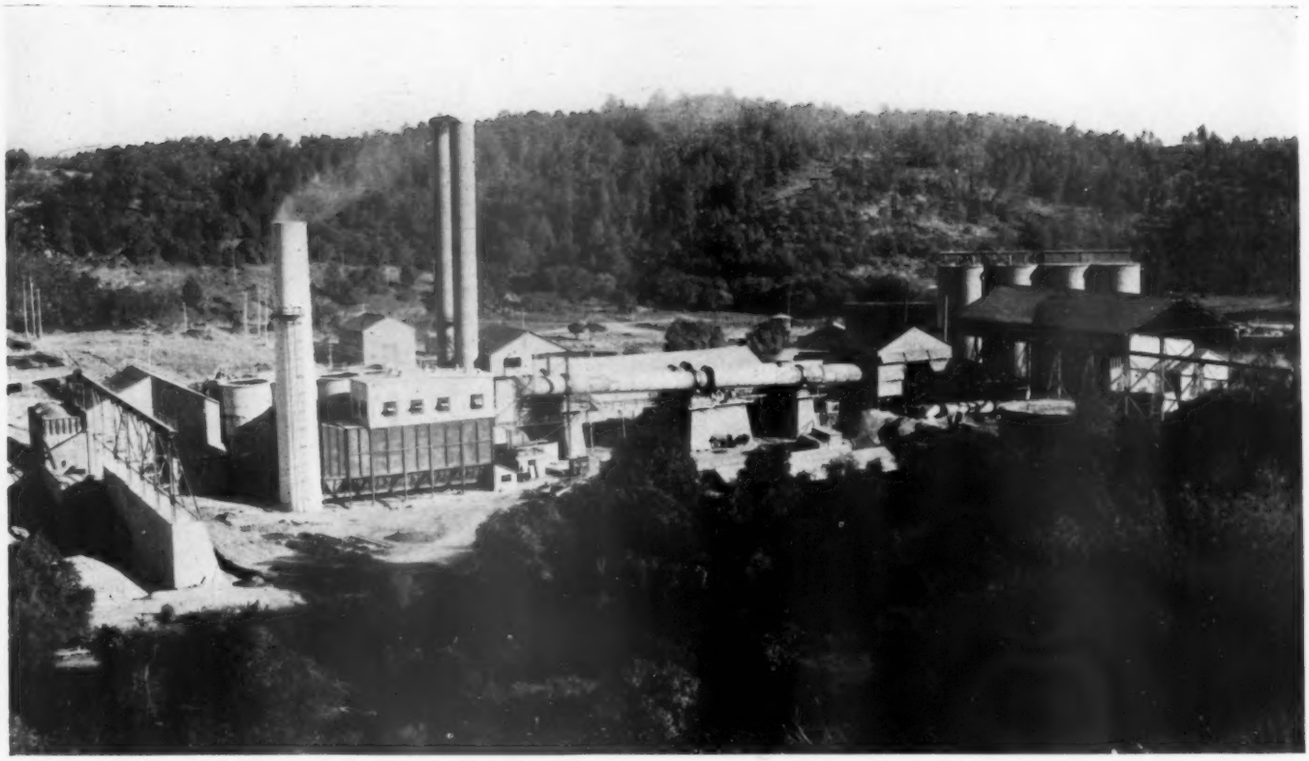
"Mere adoption of codes has had no effect on the lying ten per cent. of our industry. No, they go right ahead with their lies. They continue to play their tricks upon the American consumer and to bring trouble and discredit upon the rest of us. . . . Can we, as an industry, stand up and say the social and economic implications of advertising are no concern our ours? Or that the object of advertising is to sell goods, and that *anything* which sells more goods is good advertising? Or, can we, as an industry, claim that we're only one small cog in the vast industrial machine, so why blame anything on us?"

THIS problem of truthful advertising affects every type of business—those which, like heavy machinery, cement, aggregates, and so on, have been comparatively free from fraudulent advertising, as well as those manufacturing products of general consumption which have been the worst offenders. Ruthless, conscienceless advertising is responsible for much—we are inclined to say most—of the bad reputation for good faith, honesty and fair dealing which the few have inflicted on the many. However upright, clean and straightforward any single company's practices may have been, the rapidly growing mistrust of all business, engendered by the unwise and unethical actions of the minority, is making its way to sound and reasonable profit-making increasingly difficult and insecure. The sincere and effective policing of unethical conduct becomes the duty of every serious business man who wishes to escape the rigors, embarrassments and restrictions of government regulation.

Electrical-Precipitator Installation Important Phase of Improvement Program at Plant of Calaveras Cement Co.

By W. E. TRAUFFER



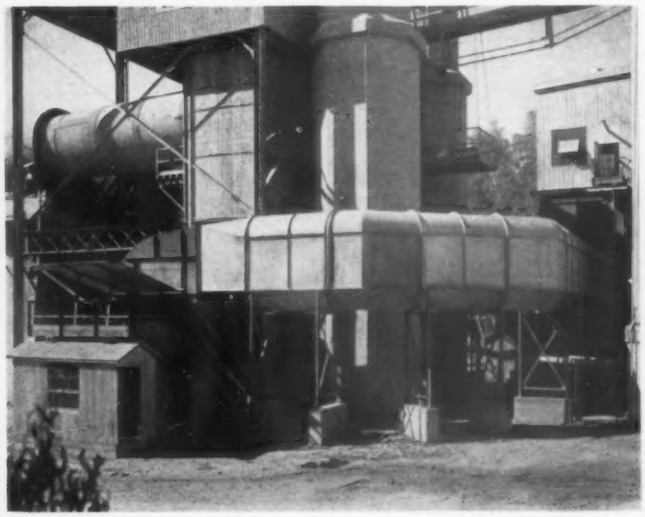


The plant of the Calaveras Cement Co. near San Andreas, Cal. The new electrical precipitator and stack are in foreground. At extreme left is one of new concrete walls for raw-material storage.

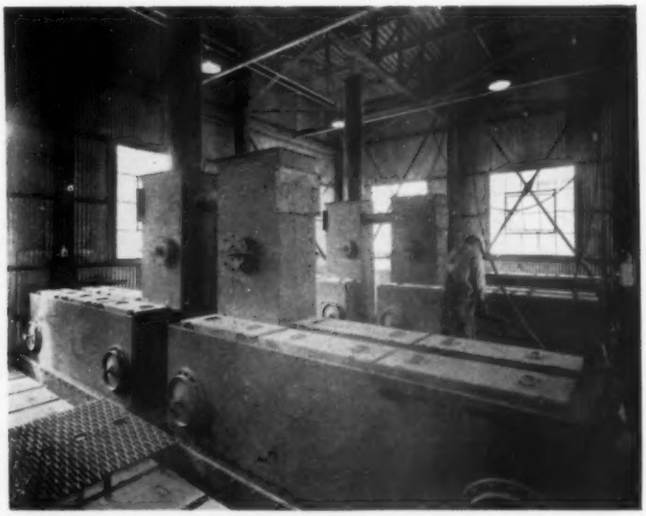
AT SAN ANDREAS, Cal., in the heart of the Mother Lode Country, from which centuries of erosion washed gold-bearing gravel into the creek and river beds, is the plant of the Calaveras Cement Co. Built in 1926, this plant has long been rated one of the most efficient operations in the cement industry, but in the last two years it has been so improved that it is now one of the show places of the industry on the Pacific Coast. Every department of the plant from the quarries to the pack-house has been modernized with the result that a wide variety of cements can now be made. The products of this plant include: standard Portland cement, white Portland cement, pumicite or Portland-puzzuolan cement, plastic early-hardening cement, and modified or low-heat Portland cement.

The history of the quarries which supply this plant would alone make an interesting article. When the plant went into operation in June, 1926, the stone and shale required were delivered from Quarry No. 1, which is about ½ mi. from the plant. Quarries No. 2 and 4 were later opened but most of the stone now used is obtained from Quarry No. 1. The stone in this quarry will average about 70 per cent. calcium carbonate. The shale is quarried with the limestone from the same quarry.

A gasoline and a Diesel locomotive were used to haul stone and shale to the plant until 1935, when this method was abandoned in favor of motor-truck haulage. Quarry No. 4, which was opened in 1935, contains a very



Draft fan and duct connecting one of the kilns with the electrical precipitator at right.



Operating floor of precipitator with air-hammer being used to clean collecting electrodes.

The new electric shovel loading stone into one of the trucks which haul it from Quarry No. 1 to the cement plant.

One of the trucks discharging its load of stone into the primary crusher. Old rotary car dumper is at left.

pure limestone averaging 95 per cent. calcium carbonate or better. This quarry has been developed to a point where it is able to supply a large part of the raw material for the plant when needed. There is a 5½-mi. roadway from this quarry to the plant. Its construction required the excavation of 200,000 cu. yd. of material and the erection of three trestles; one of them has in it a concrete overpass crossing the scenic Mother Lode Highway. At no point does the grade exceed 1 per cent., and all the curves were designed for possible future railway haulage. The white clay used in the manufacture of white cement is obtained from a near source, as is also an extremely-fine rhyolitic sand used in the manufacture of pumicite cement.

The drilling in Quarry No. 1 is done with well drills and jackhammers. Shots bringing down as much as 200,000 tons of stone are made. A Bucyrus-Erie 75-B electric shovel for No. 1 quarry was purchased in 1936, and it loads stone and shale into trucks. This stone is then hauled, weighed and dumped into the primary crusher. At present five trucks are used in this work. A 50-ton Fairbanks scale is used to weigh the stone and shale. The rotary car dumper formerly used has been left in place for possible future use.

In the secondary-crushing building a second gyratory crusher duplicating the first was installed in 1936, eliminating a "bottle-neck" in the flow of material. At the same time reinforced-concrete foundations for both crushers were placed in order to take vibration out of the steel structure, concrete retaining walls were built under the rock-storage gantry to confine the rock and save handling costs; and supporting cross walls incase the steel A-frames under the crane rails, giving them much needed protection. This work was done by the Macdonald Engineering Co.

Also in 1936 the two raw Compeb mills were equipped with four screens served by two Wilfley slurry pumps.

A Lee cooler was installed in 1935 to serve one of the two rotary kilns. On October 15, 1937, a Western Precipitation Corp. Cottrell electrical precipitator was connected to this kiln and it will soon be connected to the B kiln. Kiln gases are drawn from the precipitator through a concrete stack, which was built at the same time, and a dust-recovery system from hoppers under the precipitator feeds the dust back into the kilns.

Earily in 1937 a new Compeb mill and three additional Sturtevant air-separators were installed in the finish-grinding department. Each of the mills is served by a new Allis-Chalmers bag-type dust-collector. Two new Fuller-Kinyon pumps and a Robinson pump were added in this department.

In 1936 two of the eight cement-storage silos were divided into five compartments each by the Macdonald Engineering Co., and a new Fuller-Kinyon pump was installed to serve a new 3-tube white-cement packer.

Many other changes made in the last two years include the installation of a new Ingersoll-Rand air-compressor, the construction of a new refractory-brick and oil storage building, and the improvement and modernization of the laboratories and offices. All the electric power-lines in the plant were put below ground in fiber ducts and new transformers were installed to handle the increased plant load.

To go back to the primary-crusher, the stone and shale are dumped from the trucks into the 42-in. Allis-

Chalmers Superior McCully primary gyratory crusher which crushes it to 8 in. and under. A 215-ft. belt-conveyor discharges this stone on grizzlies and into the two Allis-Chalmers 10-in. gyratory secondary crushers, which reduce the stone to minus 1 in. ring before it goes to the 25,000-ton rock storage. Practically all the shale passes through the 1¾-in. grizzlies and is discharged on a pile in the storage separate from the high and low limestones.

A Milwaukee crane fitted with a 3-cu. yd. clam-shell bucket blends these materials as it feeds them into two 330-ton bins serving the two No. 8726 Allis-Chalmers Compeb mills. Two Wilfley 6-in. pumps transfer the product of the first compartments of these mills to two pairs of Tyler Hum-mer screens equipped with 20-mesh screen cloth. The material retained on these screens is returned to the mill feed. The slurry containing the fines is discharged into a sump from which is it scooped into the second compartments of the mills.

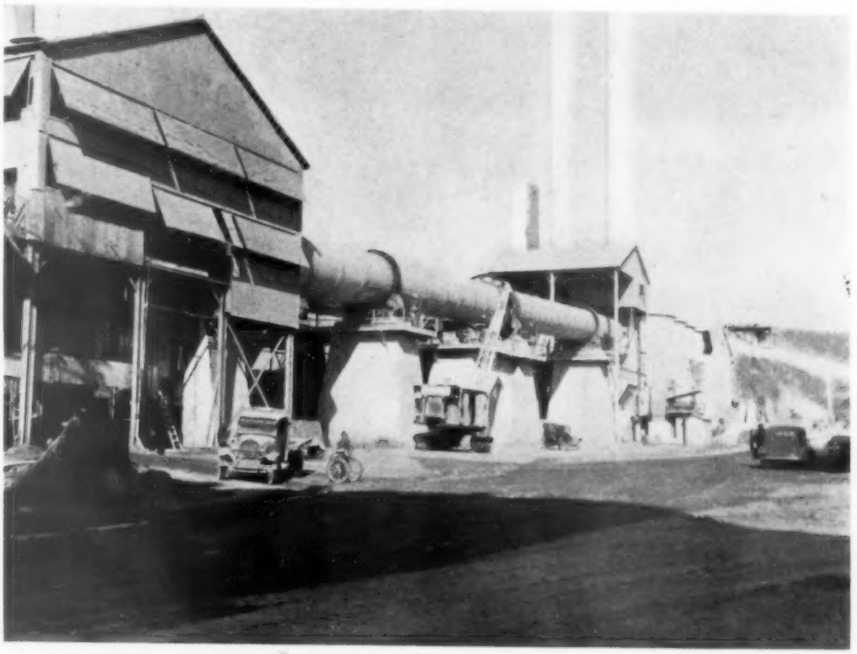
The finished slurry is discharged from the mills direct into two Allis-Chalmers air-lift pumps which transfer it to eight 900-bbl. conical-bottom slurry-storage tanks. Air agitation only is used in these tanks, and another air-lift pump transfers the slurry from one tank to another for blending. The corrected slurry is discharged by gravity into two kiln-feed tanks. Two Wilfley 4-in. pumps force the slurry from these tanks to Allis-Chalmers Ferris-wheel feeders serving the two kilns. The feeders are driven by Reeves variable-speed reducers, the motors being interlocked with the kiln motors.

The two Allis-Chalmers rotary kilns are 11¼ ft. and 10 ft. in diameter and 240 ft. long and are identical except that kiln A is equipped with an F. L. Smidth 40-ft. dense chain system. Excellent results have been obtained from this chain installation. The clinker is discharged from kiln B into an Allis-Chalmers 8-ft. by 73-ft. rotary cooler. The clinker from kiln A is discharged into a Cement Mill Equipment Co. 74-ft. Lee Process grate-type cooler. In addition to preheating the combustion air for the kiln this cooler has been responsible for a marked improvement in the grindability of the clinker and an increase in the kiln's capacity. Kiln A is producing about 2,000 bbl. and kiln B about 1,750 bbl. of clinker daily. The clinker from both coolers is discharged direct into storage.

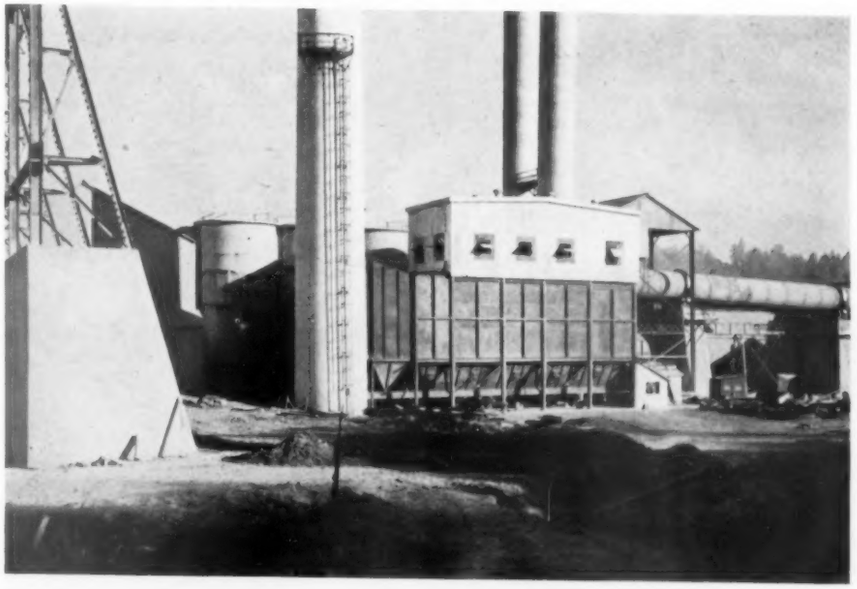
The kilns are oil-fired with Dubbs fuel which is 8.7 specific gravity and contains 18,280 B.t.u. per lb. (8.40 lb. per gal.)

The old induced-draft fan on kiln A was replaced by a No. 48 Buffalo induced-draft fan. A similar fan was placed on kiln B. Both fans are connected by a balloon-type duct to the precipitator. An F. L. Smidth draft-control system and louvre dampers are controlled from the burner platform.

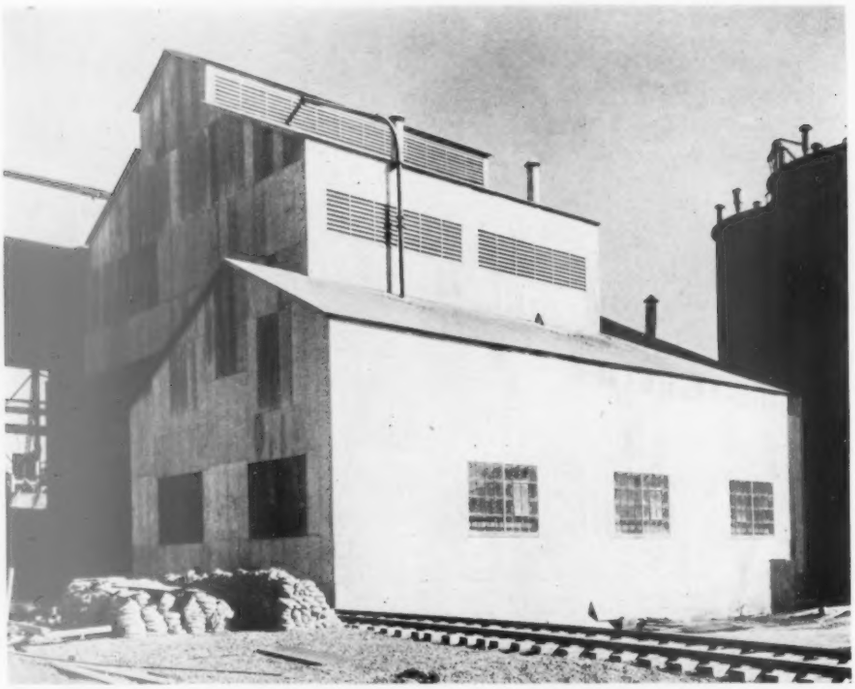
The Cottrell precipitator is of standard construction with two separate compartments of three sections each. It has a rated capacity of 240,000 cu. ft. per min. The entire unit is 23 ft. 4 in. wide, 66 ft. 2 in. long and 34 ft. 7 in. high to the operating floor. When both kilns are connected, separate flues will carry the gases to the inlet chamber of the precipitator. Distribution vanes in this chamber divide the gas equally between the two compartments of the precipitator. Multivane dampers control the gas flow, so that either unit can be shut off entirely and all the gas passed through one compartment with either or both of the kilns in operation. Electric-motor operated louvre dampers at the discharge ends of these compartments

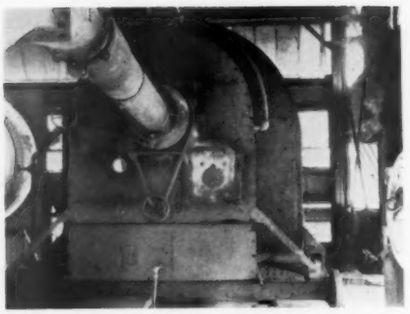


View of plant showing shaking-grate clinker cooler, kilns, old and new stacks, etc.



The electrical precipitator with collecting hoppers below and new stack at left. In background are the slurry-storage tanks.



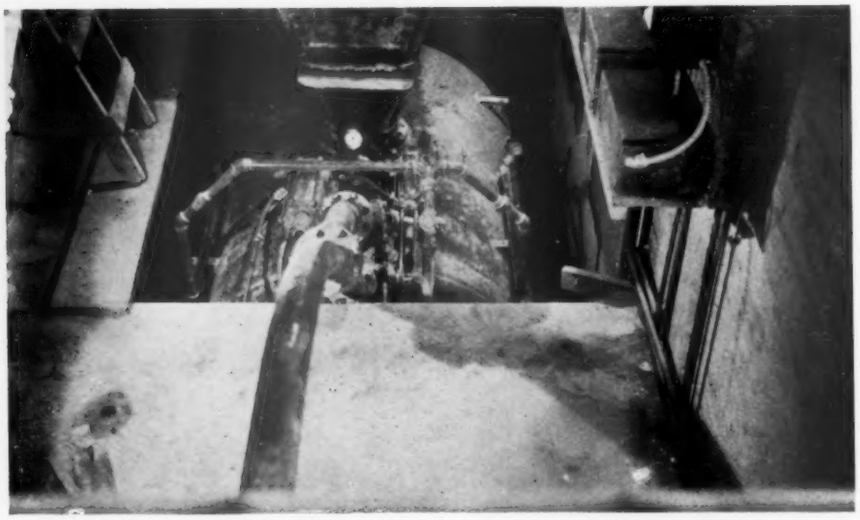


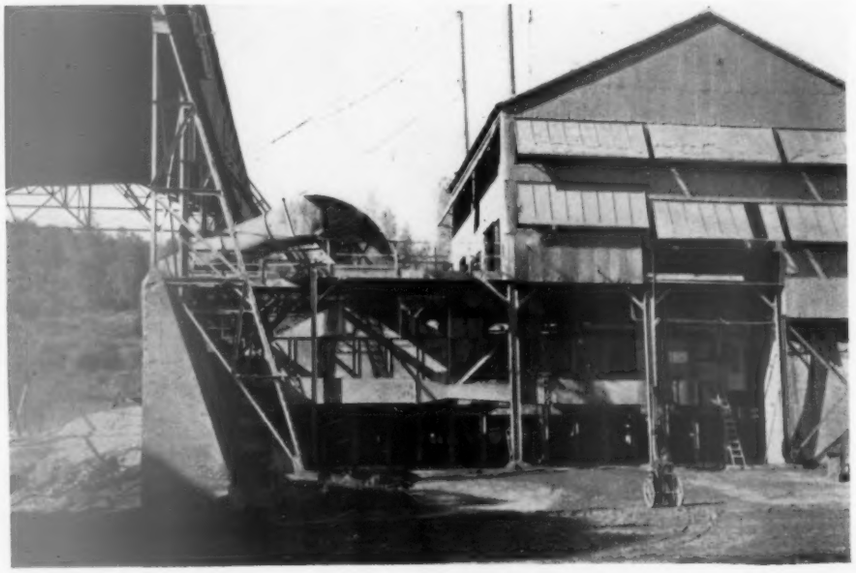
(ABOVE)—The special firing hood connecting one of the two kilns with the grate-type clinker cooler.

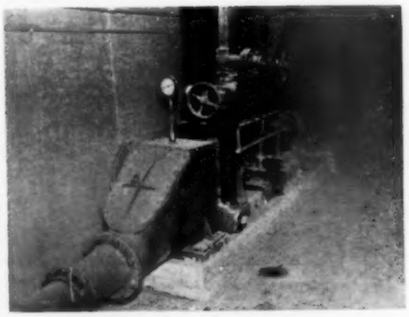
(LEFT)—The additions made to the clinker-grinding mill building.

(ABOVE)—Three of the four new vibrating screens in closed circuit with the raw-material grinding mills.

(RIGHT)—A pneumatic-conveying system recently installed in the finish mill.







(ABOVE)—A new 8-in. pneumatic conveyor installed in the finish-grinding department.

(LEFT)—The grate-type cooler from which clinker is discharged into the storage at left.

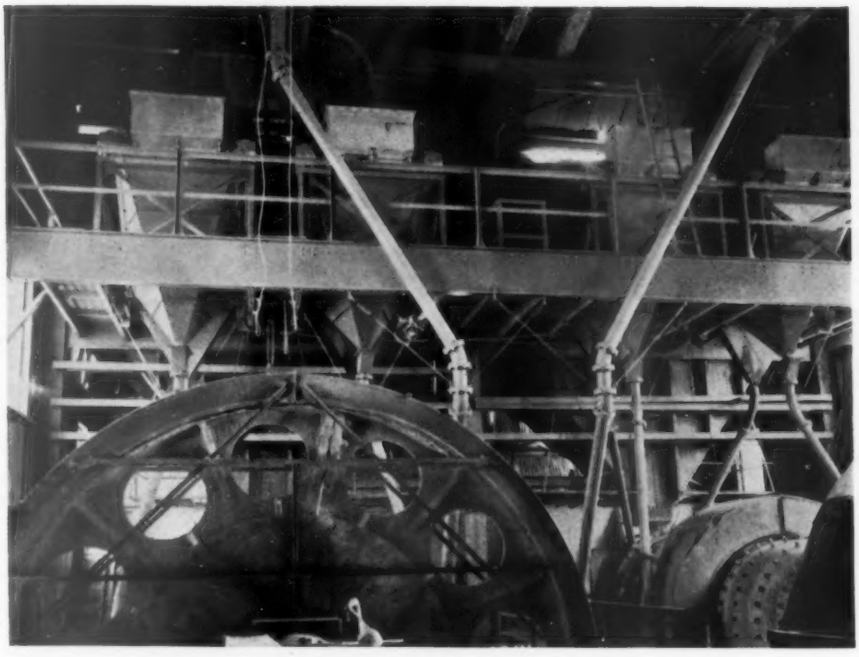
control the flow of the dust-free gas into the single reinforced-concrete stack. This stack, built by the Rust Engineering Co., is 125-ft. high and has an inside diameter of 13½-ft. at the top.

In each of the six sections of this precipitator are 17 rod curtains which act as collecting electrodes. These curtains are 8 ft. long in the direction of the gas flow and 18 ft. high. They are spaced 8 in. apart to form ducts, in the centers of which the discharge electrode wires are suspended. The discharge electrodes are cleaned at intervals by rapping hammers controlled from the operating floor. The collecting electrodes are cleaned by the operator with an air-hammer which is suspended from a trolley so that it can be moved over both compartments. This hammer is used to rap the anvil studs which are connected to each collecting electrode and which project up through the floor.

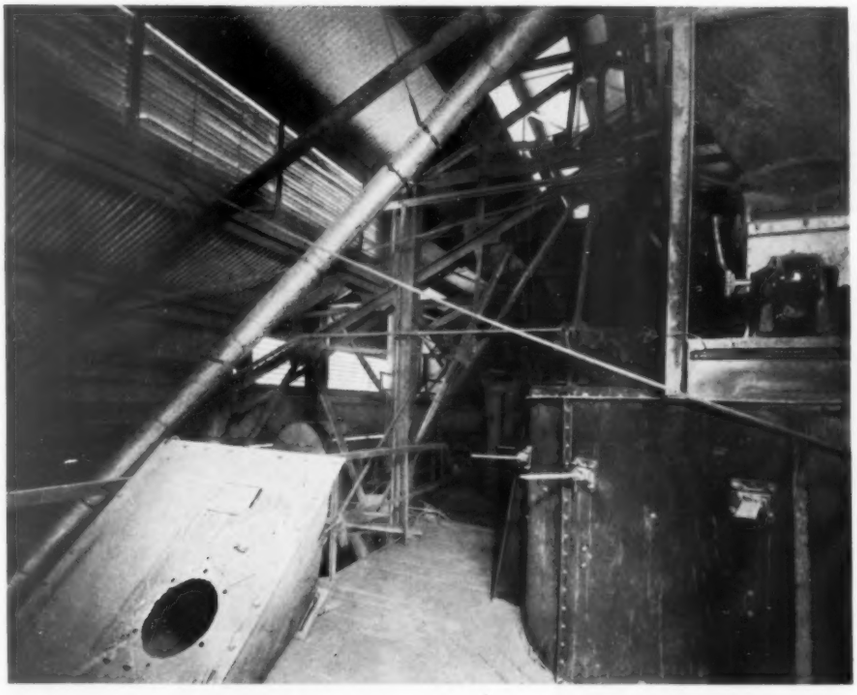
When it is necessary to shut down either of the two compartments for inspection or adjustment it is cut off from the gas flow. All the manholes are then opened and the stack draft, acting on both the outlet and inlet flues, cools this compartment and removes the dusty gas in a short time so that it can be entered safely. Removable cover plates sealed with asbestos gaskets provide access to the top of the precipitator and to the hoppers.

In the substation on the operating floor of the precipitator are located the three sets of transformers and rectifiers and the switchboard. Each rectifier is a mechanical switch with a stator disk of bakelite mounted on the motor shaft. Metal tips on the rotator disk contact shoes on the stator disk with a clearance of $\frac{3}{32}$ in. Each transformer is a single-phase variable-ratio unit. The rectifiers convert the single phase of the secondary current to a uni-directional interrupted current. The switchboard has a tap switch connected to whichever of the taps is desired from the transformer, and a rheostat for controlling a bank of resistance coils located on the primary power-supply. The amperage used on each electrical set varies from 6 to 12. The primary power is reduced from the nominal 440 v. to about 380 v. by means of resistance connected in the circuit. The high-tension power connected to the precipitator is 50,000 v.

The precipitated dust is collected in hoppers under the two compartments. One drag-conveyor under each compartment discharges the dust to a screw-conveyor which ordinarily feeds a 4-in. Fuller-Kinyon Type H pump. Dust of high alkali content can be disposed of separately. The pump feeds the dust into two conical-bottom bins on the kiln-feeder floor. Under these bins are Fuller Co. rotary feeders driven by U. S. Vari-Drive motors which regulate the feed of this dust into the kilns.



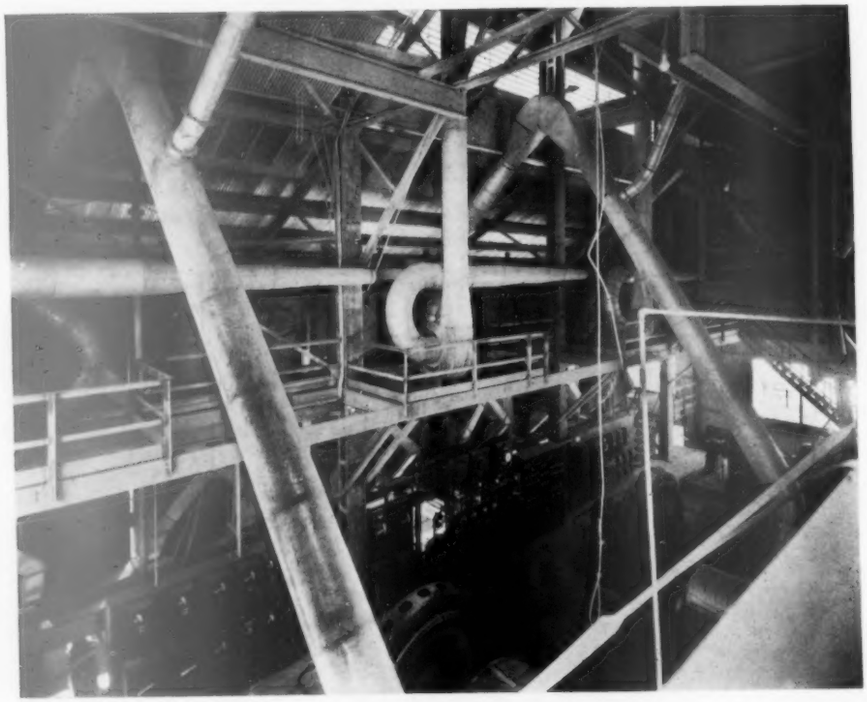
The two raw-grinding compartment mills in closed circuit with four vibrating screens above. The slurry-pump lines are shown.



Several of the air-separators in the finish-grinding department with bins and feeders above.

One of the two new 6-in. centrifugal pumps which feed the slurry screens.

The three clinker-grinding compartment mills with feed bins in background. Above are some of the air-separators used in closed circuit.



View showing the dust-collectors connected to the clinker-grinding mills. Below are the mill motors and switchboard.

A Milwaukee traveling crane, fitted with a 3-cu. yd. clam-shell bucket, transfers the clinker and gypsum from storage to bins supplying the three finish-grinding mills. Table feeders are used. The two Allis-Chalmers Compeb mills and the new mill are all No. 826 machines. A 10-ft. Sturtevant air-separator was connected to one of the Compeb mills in 1931. In 1937, when the new Compeb mill was installed, two 16-ft. and one 14-ft. Sturtevant separators were added to the finish-grinding plant. Screw-conveyors and two new Fuller-Kinyon pumps, a 5-in. and an 8-in., were installed to make possible a number of flows between the mills and the separators. A 6-in. pump installed in 1931 is also used for this purpose.

This new mill, with the new separators, pumps and conveyors, was installed primarily to make possible an increase in cement fineness as well as to provide additional grinding capacity. The new arrangement is flexible, and can be operated in open or closed circuit. This flexibility makes possible the production of different types of cement.

Two 6-in. Fuller-Kinyon pumps were used to transfer the finished cement to the storage silos. A Robinson pneumatic-conveying system rated at 180-bbl. per hr. capacity has been installed to alternate with one of these pumps.

Separation of Mica by Frictional Electricity

A Bureau of Mines research begun on pyroelectric separation of minerals, especially mica, has brought out the fact that mica separation by this supposed effect is actually a separation by frictional electricity generated by mica flakes sliding down glass shelves. A slide of long distance is not needed, and whereas glass shelves 6 in. long were used at first the size was later cut to 1.5 in. The charged mica sticks at the lower edge of the glass, while the trajectory of quartz and feldspar grains carries them onto the next glass shelf. Variations and improvements are necessary to remove all of the mica in one treatment but with several treatments it has been possible to remove completely muscovite mica from a crushed and dried graphic granite.—*1937 Annual Report, Nonmetals Division, U. S. Bureau of Mines.*

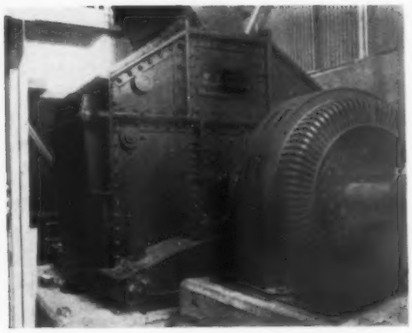
Molding-Sand Industry Prospers in Tennessee

The molding sand industry of Tennessee, according to figures just published by the Tennessee Division of Geology in its New Markets Circular 5 on Molding Sand, is producing in excess of 30,000 tons annually. This tonnage places Tennessee among the top-rank producers of molding sand in the South.

Production is from the Ripley (cretaceous) formation of West Tennessee, centering in the Benton-Carroll counties area. Two major operators, the Southern Sand Co. and the Porter Warner organization, are producing blended sands in modernly equipped plants, that of the latter having just recently been completed at a reported cost of over $30,000. Minor production of crude or unblended sand comes from three other operators in this area. The bulk of sand shipments goes to foundries within the state.

CEMENT in 1937...

Production, Shipments Up Slightly. Industry Spends Millions for Improvements. Two New Plants Building.

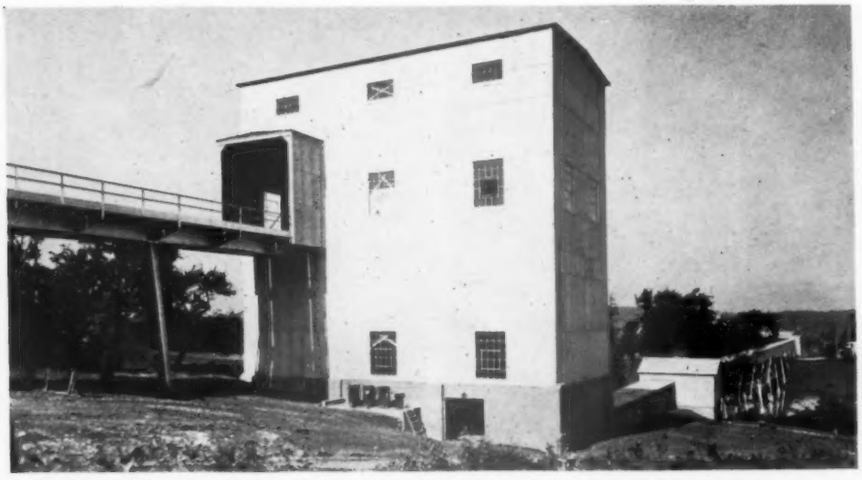


The reversible hammer-mill secondary crusher in the Hudson, N. Y., plant of the Universal Atlas Cement Co.

THE year 1937 was one of ups and downs for the cement industry. In each of the first seven months of the year the cement shipments exceeded those in the corresponding months of 1936. For the first six months shipments showed an increase of over 24 per cent. In October and November, however, shipments dropped slightly below those of the same months in 1936. No figures are yet available for December, but it is doubtful if shipments in that month fell much below the 1936 level. Assuming this to be the case, the final cement-shipments figures for 1937 would show an increase of about 3 per cent. over 1936.

Prospects for 1938 are dependent on so many factors that no one but a sports commentator would dare to put himself out on a limb and make a guess. A renewed confidence on the part of government in business and on the part of business in government and, above all, on the part of the people in both would result in a continued increase in demand. It is difficult to justify any very pessimistic predictions. The Wagner Housing Act will undoubtedly cause a spurt in home construction which should outweigh the decreased governmental expenditures on large construction projects and the reduction in Federal aid for state-highway construction. Recent increases in construction contracts over the 1937 level are also encouraging.

More money was spent by the cement industry in 1937 for plant improvements, new equipment, etc., than in any year since the depression. While the bulk of these expenditures were made to keep up or improve the



The new crusher building at Hudson with trestle from quarry at left. The conveyor system to plant is at right.

Recent photograph of the Hudson, N. Y., plant showing the progress that has been made. In the center are the raw and finish mill buildings with the storage building at the right. At the left are the raw-material blending silos.

The raw-material storage under construction at he Leeds, Ala., plant of the Universal Atals Cement Co. A closed-circuit wet raw-grinding method will be used.

The clinker stoarge under construction at Leeds. In left background are the old and new cement-storage silos and the new packhouse.

Installing the new 42-in. gyratory primary crusher at the Leeds plant. In the background is the quarry-track trestle under construction.

general condition of many plants which had been allowed to deteriorate during recent years, much of it was made to enable these plants to meet the new surface-area specifications. Dozens of plants were equipped for the direct firing of their kilns and added cement-storage capacity was found necessary in many plants to accommodate the growing number of types of cement in demand.

There were no changes in the ownership of any of the existing plants. The name of the Republic Portland Cement Co. at Longhorn, near San Antonio, Tex., was changed to the Longhorn Portland Cement Co. to identify the company more closely with the trade name of its product.

A number of plants which had been shut down for years resumed operation in 1937. The plant of the Peerless Cement Corp. at Port Huron, Mich., was reopened May 1 after having been closed since 1932. That of the Vulcanite Portland Cement Co. at Vulcanite, N. J., has been reopened as has the Oro Grande, Cal., plant of the Riverside Cement Co. The Stroh, Ind., plant of the Wabash Portland Cement Co. was reopened in June after having been shut down since 1931.

The Consolidated Cement Corp. in 1937 moved the equipment from its plant at Mildred, Kan., to its Fredonia, Kan., plant. This equipment included tube-mills, motors, electrical equipment, steel buildings and a 240-ft. rotary kiln.

The usual rumors concerning prospective new cement plants were circulated during the year. According to these, new plants were contemplated in Oklahoma, Mississippi and North Carolina. Actually construction was begun on two new plants.

The new plant of the Gulf Portland Cement Co. at Houston, Tex., is a new venture which will add about 850 bbl. daily to the capacity of the industry. This plant will be in operation about March 1, 1938 and a description of the progress being made in its construction appears in this issue of PIT AND QUARRY.

The other new plant under construction is that of the Universal Atlas Cement Co. at Leeds, Ala. This plant is replacing the old one there and is being built in somewhat the same way as the company's Hudson, N. Y., plant. Each old department is being operated until the corresponding new department is in operation. At Leeds, however, only the existing storage silos and two of the old kilns are being retained, the latter as auxiliaries. This is said to be the first

plant in this country designed from the start for closed-circuit wet raw grinding. Actual field construction is now about 30 per cent. completed and operation is expected to begin about May 1. The new plant capacity will be about 1,400,000 bbl. annually with only the new kilns in operation. Two of the old kilns will be retained in reserve and the grinding machinery will have sufficient capacity to serve all four kilns.

In the quarry a 2½-cu. yd. electric shovel and a Woodford remote-controlled electric haulage system are being added. The new crushing plant houses a 42-in. gyratory primary crusher and a 42-in. by 66-in. hammer-mill. A belt-conveyor will feed raw material into a 100-ft. by 384-ft. storage building served by a 10-ton overhead traveling crane. Shale and sandstone will also be stored in this building. Automatic feeders will serve two 9½-ft. by 8-ft. ball-tube

Air-separator arrangement at the plant of the Allentown Portland Cement Co. One of the pneumatic pumps which deliver cement to storage is in the foreground.

mills which will be in closed circuit with two Dorr rake classifiers. The product of these rakes will go to two Dorr bowl-and-rake classifiers in closed circuit with a second pair of mills identical with those described. The product of these mills is to be returned to the bowls, whose product will be transferred by two rubber-lined centrifugal pumps to either of two 200-ft. Dorr thickeners. Each thickener will be used for a different type of cement.

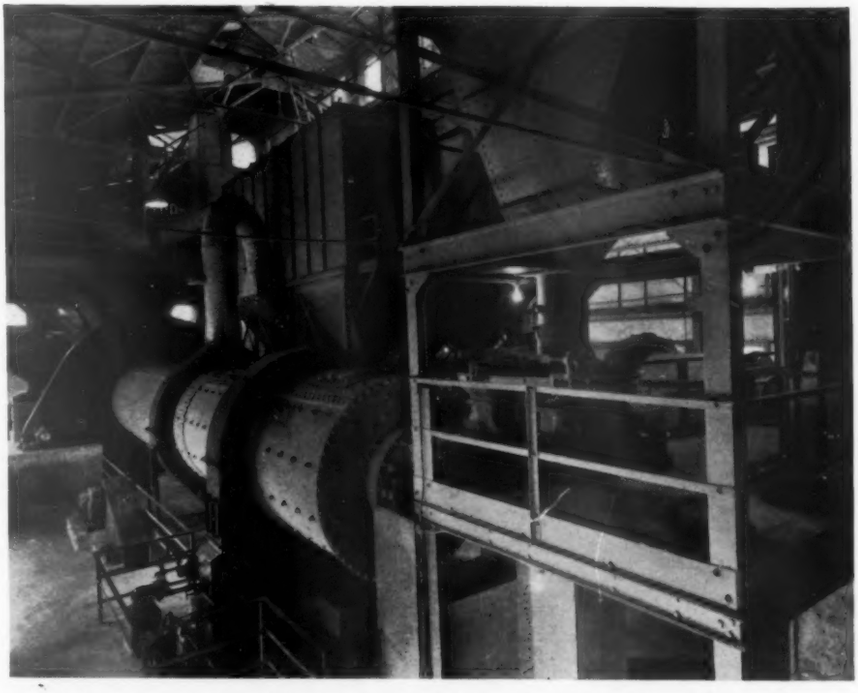
The thickened slurry will be transferred to four storage tanks under the two new 10-ft. by 301-ft. kilns, which will be equipped with regenerative chain systems and direct-firing coal mills. Ward-Leonard drives on these kilns will give a wide range of speed control in 100 steps. Cubicle-type switchboards will contain the all control and recording equipment for each kiln and its coal mill and cooler.

Another view showing progress of construction at Universal Atlas' Leeds plant. In the background are the new office and shop buildings.

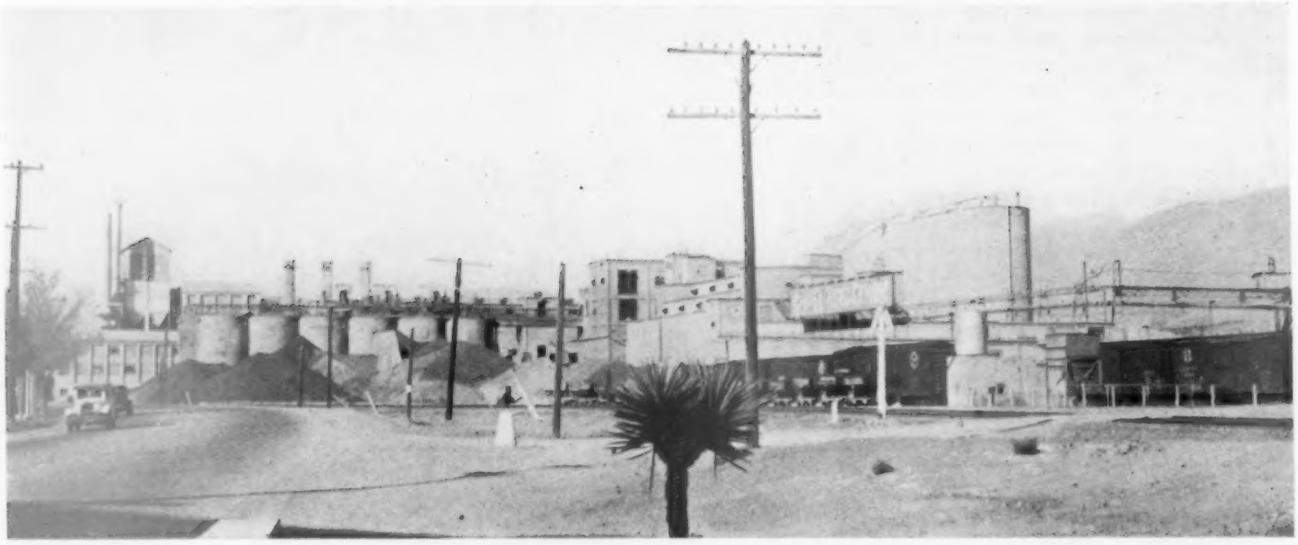
Air-quenching vibrating coolers will be used, and the clinker will be elevated into a 100-ft. by 288-ft. covered concrete storage building served by a 10-ton crane. In the finish-grinding department each of the two ball-tube mills will be in closed-circuit with a pair of vibrating screens. The final grinding will be done by two 8-ft. by 30-ft. two-compartment mills, each compartment in closed circuit with its individual 16-ft. separator. Fuller-Kinyon pumps will transfer the cement to 8 new silos having a capacity of 165,000 bbl. and the 12 old silos which hold 65,000 bbl. The new silos were built by the Nicholson Co.

Rebuilding of the Hudson, N. Y., plant of the Universal Atlas Cement Co. is now practically completed except for minor details. The new crushing department went into operation on November 1 and the new raw-grinding department soon afterward.

The new finish-grinding department is now ready to run. Operation of the entire plant was suspended December 1 for the winter with re-



The clinker-mill room of the Allentown Portland Cement Co. plant at Evansville, Pa. A clinker feeder and the second mill are at the right.



The plant of the Southwestern Portland Cement Co. at El Paso, Texas. At the right are the new cement-storage silos.

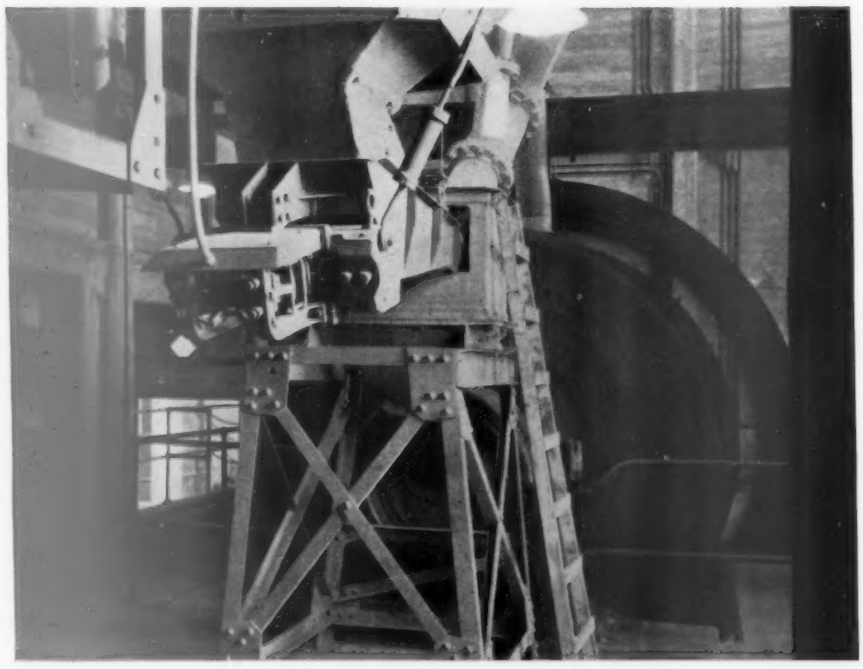
sumption planned early in 1938. Old buildings which have been replaced in this program will be torn down at that time and the entire property will be landscaped.

The rebuilding program at this plant was so planned that each new department of the plant was built while the corresponding old department continued in operation. Only the existing cement-storage silos and kilns were retained. The result will be a practically new plant with a capacity of 7,200 bbl., the same as that of the plant it replaces. A complete description of the progress made up to that time was published in the October, 1937 issue of PIT AND QUARRY.

The first step in this program was the installation in 1936 of two new 2½-cu. yd. electric shovels and an electric well-drill in the quarry. The new crusher building houses a 42-in. gyratory primary crusher and a reversible hammer-mill used for secondary reduction. A series of belt-conveyors 1,201 ft. long discharge the rock into the new storage building, which is 560 ft. long and 100 ft. wide and is built entirely of reinforced concrete. Two overhead traveling cranes serve this building, which is also used for storing shale, gypsum and clinker.

Three Babcock & Wilcox No. 366 raw-material drying and grinding mills are used, each in closed circuit with a

The 14-ft. separator added to the Southwestern plant at El Paso.



The new preliminary clinker-grinding mill with vibrating feeder in the El Paso plant.

16-ft. air-separator. A Fuller-Kinyon pump feeds the pulverized raw material into six 5,000-bbl. concrete silos. Blending is accomplished by drawing from four of these six tanks at once in the desired proportions and discharging alternately into two smaller silos. An aërating system in each of these tanks makes an intimate mixture of its contents before it is fed to the kilns.

The three existing 12-ft. by 233-ft. rotary kilns have been equipped with direct-firing coal mills. Two 175-ft. kilns and the two sets of coolers have been retained. In the clinker-grinding department a screen and a 10-in. gyratory crusher prepare the clinker for a 10½-ft. by 12-ft. ball-mill which is in closed-circuit with four vibrating screens. Each of the three 8-ft. by 30-ft. two-compartment mills

used for finish grinding is in closed circuit with two 16-ft. separators, one for each compartment.

At the Independence, Kan., plant of the Universal Atlas Cement Co. 12 reinforced-concrete cement-storage silos with a combined capacity of 125,000 bbl. were built by the Burrell Engineering & Construction Co. A

The plants of the Marquette Cement Mfg. Co. at Oglesby, Ill. Tracks to quarries are at left.

pneumatic-conveying system and three Parsons dust-collectors were installed.

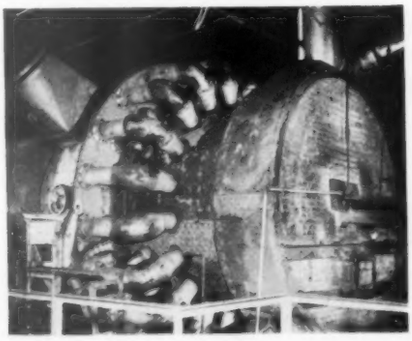
The Calaveras Cement Co. in 1937 completed an extensive improvement program at its San Andreas, Cal., plant. The main item was a new Western Precipitation Corp. Cottrell electrical precipitator connected to the two kilns and a new stack. These and other improvements are described in detail in another article in this issue of PIT AND QUARRY.

The Allentown Portland Cement Co. in 1937 completed an extensive improvement program described in de-

Truck discharging stone into skip car at Cape Girardeau quarry of Marquette.

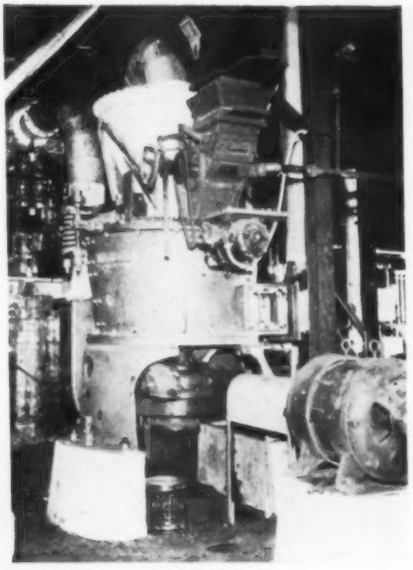
tail in the November, 1937 issue of PIT AND QUARRY. The clinker-grinding department was entirely rebuilt and the two original tube-mills moved to the raw-grinding department. Five 57-in. Fuller mills are now used for the preliminary grindings of the stone and their product goes to two 16-ft. Sturtevant separators. The tailings go to the two aforementioned tube-mills, whose product is returned to the separators. In the clinker-grinding department table feeders serve the two new F. L. Smidth 7-ft. by 46-ft. 3-compartment mills. These mills are of a new type with center discharge, and the second compartment of each mill is in closed circuit with an individual 16-ft. Sturtevant separator. A new type of sliding-shoe tire bearing is used on these mills. Each mill is also connected to a Dracco dust-collector.

The Southwestern Portland Cement Co. in 1937 concentrated most of its efforts on its El Paso, Tex., plant. An Allis-Chalmers 9½-ft. and 8-ft. by 10-ft. Preliminator was installed



One of the two recuperators on the kilns in the Diamond plant.

in the finish-grinding department to prepare a sized clinker feed for the three 7-ft. by 22-ft. Compeb mills. These have, in turn, been placed in closed circuit with four new Tyler Hum-mer screens. A Jeffrey-Traylor feeder for the Preliminator, a Norblo dust-collector, and Fuller Co. rotary mill feeders were also added. In the



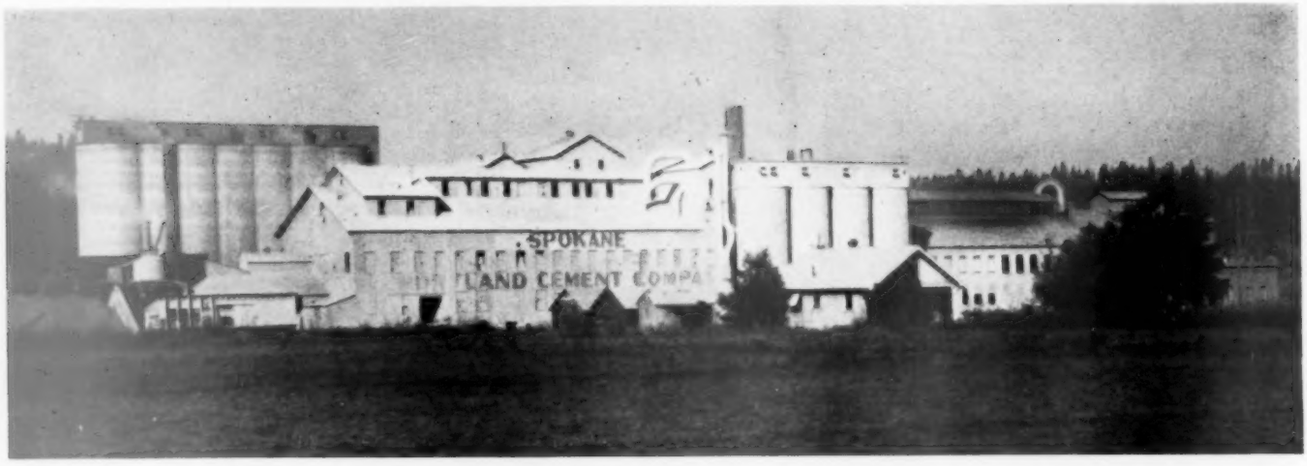
One of the two bowl mills in the plant of the Diamond Portland Cement Co., Middle Branch, O.

raw-grinding department a 14-ft. Raymond separator was installed. Five 25-ft. by 80-ft. storage silos were erected by the Macdonald Engineering Co.

The Marquette Cement Manufacturing Co. continued its improvement programs at both its plants and has announced further extensive changes for 1938. At Cape Girardeau, Mo., the major improvement was a Western Precipitation Corp. Cottrell precipitator connected to the waste-heat boilers and to a new 350-ft. concrete stack. Two Traylor Type TY clinker crushers were installed. At the Oglesby, Ill., plant three Caterpillar Diesel tractors and three Athey 13-cu. yd. 2-way dump trailers replaced the locomotives and cars formerly used in one of the quarries. A complete description of the improvements made to these plants was published in the July, 1937 issue of PIT AND QUARRY.

The Diamond Portland Cement Co., Middle Branch, O., in 1937 installed two Raymond No. 402 direct-firing bowl mills. An interesting feature of this installation is the fact that part of the coal from these mills is diverted from the kiln-feed lines to the drier-feed bins. Two Vanderwerp short-plate recuperators were installed on the two kilns. A complete description of thsee improvements was published in the July, 1937 issue of PIT AND QUARRY.

The Olympic Portland Cement Co. at Bellingham, Wash., in 1937 installed Babcock & Wilcox direct-firing coal mills on its three kilns. These are said to be the first mills of this type installed on the kiln firing floor. A



The plant of the Spokane Portland Cement Co. at Irvin, Wash. All of the silos visible were built in 1935.

General Electric Selsyn system was also installed to synchronize the slurry feed with the kiln speed. An automatic scale is being installed for proportioning the clinker.

The plant of the Spokane Portland Cement Co., at Irvin, Wash., made no improvements comparable to those of 1935 when a Lepol kiln, the first on this continent, and much other equipment were installed. However, in 1937 a Babcock & Wilcox direct-firing coal pulverizer was installed for the straight rotary kiln in this plant following the installation of a similar mill on the Lepol kiln in 1936. A Babcock & Wilcox No. 238 mill was also installed for raw grinding in closed circuit with a new 12-ft. Sturtevant separator.

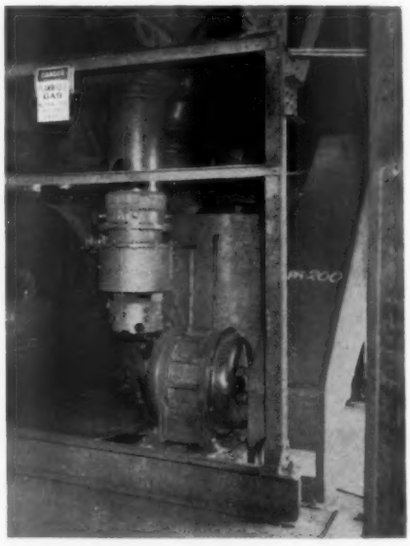
The Idaho Portland Cement Co., which built its plant at Inkom, Idaho in 1929, has for several years carried on a steady improvement program. The original plant capacity of 800 bbl. daily has been increased to 1,200 bbl., but this is incidental to the increased efficiency and economy obtained. Every department from the quarry to the pack-house has been improved. The 1937 improvements include a new Traylor Bulldog gyratory crusher, and three new storage silos each of 11,500 bbl. capacity. A new wash and change house has just been completed and a chain system is to be installed in the kiln.

An extensive improvement program was completed at the Monolith, Cal., plant of the Monolith Portland Cement Co. Eight 20-ft. by 52-ft. storage silos were built, a 4-compartment mill, Kominuters, Tyler Hum-mer screens and other machinery were installed.

The plant of the Olympic Portland Cement Co. at Bellingham, Wash. This picture was taken during some "unusual" weather.

F. L. Smidth & Co. furnished most of the equipment and did the engineering work.

The Alpha Portland Cement Corp. continued to improve its Alpha, Mo., plant. A Western Precipitation Corp. Cottrell precipitator and a second



The direct-firing coal pulverizer in the plant of the Olympic Portland Cement Co.

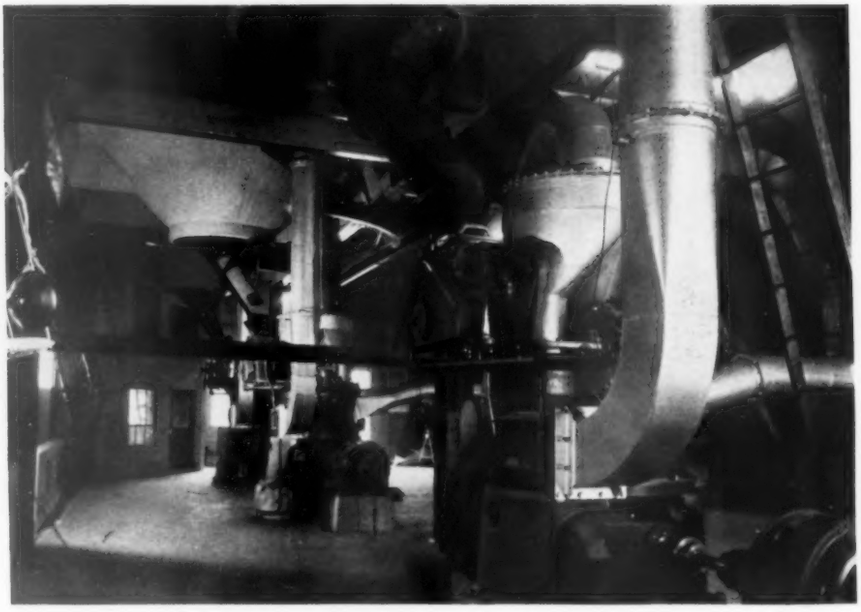
Miag Calcinator were installed. The kilns have been extended, an F. L. Smidth Skipulter, a rotary cooler and Wilfley pumps added.

The plant of the Washington-Idaho Lime Products Co., which was built in 1935, was improved for the second successive year. The rock-crushing department was enlarged and new bins, primary and secondary crushers and screens added.

Many other plants also improved their operations during the year but space does not permit description of all of them. Some of the more important improvements follow.

The Ash Grove Lime and Portland Cement Co. at Chanute, Kans., built

The new mill at Spokane, which is used for either raw or finish grinding.



The three new direct-firing bowl mills in the plant of the Petoskey Portland Cement Co. at Petoskey, Mich.

eight new 14,000-bbl. concrete silos. A dust collector was also installed.

The Green Bay Cement Co. of Pa., Neville Island, Pa. installed a Raymond bowl mill.

The Dewey Portland Cement Co. installed a Fairbanks conveyor scale for coal at Davenport, Ia., and put into operation a fleet of twelve steel barges built by the St. Louis Shipbuilding & Steel Co. At Dewey, Okla. a Bradley Hercules mill and a Raymond direct-firing coal mill were installed.

The Giant Portland Cement Co. installed a Bradley Hercules mill and a Bradley air separator.

The Hawkeye Portland Cement Co., Des Moines, Ia., installed Babcock & Wilcox direct-firing mills on its six kilns. A Jeffrey roll crusher, a Williams hammermill and a Tyler Hummer screen prepare the coal for these mills. Six conical steel feed bins supplied by the Des Moines Steel Co. are equipped with high- and low-level Bindicators.

The Hermitage Portland Cement Co., Nashville, Tenn. is installing an Allis-Chalmers clinker-grinding Preliminator and a 400-hp. motor. Other improvements have also been made.

The Huron Portland Cement Co. completed a new 60,000 bbl. capacity storage and packing plant, and a 350 foot steel dock at Muskegon, Mich. This plant is located so that both rail and water shipments of either bulk or sacked cement can be made.

The Lehigh Portland Cement Co. built new storage silos at Sandts Eddy, Pa., and installed a new pulverizer at its Fogelsville, Pa. plant.

The most important contribution of the Lone Star Cement Corp. was the completion of its new wet-process plant at Parana, Argentina. At Hudson, N. Y., a Bradley air-separator was installed, at Houston, Texas, four storage silos and a packhouse were built and at Bonner Springs, Kan., air-separators were installed in the finish-grinding department.

The Louisville Cement Co. further improved its plant at Speed, Ind. Equipment installed included a Raymond direct-firing bowl mill and Norblo dust-collectors.

The Medusa Portland Cement Co. installed a Bradley Hercules mill at Bay Bridge, O., and a Raymond bowl mill at Manitowoc, Wis. At its Dixon, Ill. plant the raw- and finish-grinding departments were entirely revamped. In the raw department three Raymond mechanical air separators and concrete blending bins with Fuller rotary feeders and a Fuller-Kinyon pump were installed. In the clinker-grinding department two Bradley Hercules mills were installed for preliminary grinding and the finishing mills were put in closed circuit with two new Raymond mechanical air separators. A Parsons bag-type dust collector was connected to the new mills.

The Missiouri Portland Cement Co. continued to improve its St. Louis, Mo., plant. Hug quarry trucks were added at the Fort Bellefontaine quarry. Many other improvements were also made.

The Petoskey Portland Cement Co., Petoskey, Mich., installed three Raymond direct-firing bowl mills, a Schaffer Poidometer and much other equipment.

The Riverside Cement Co. installed three Sturtevant separators in its Riverside, Cal., plant. Extensive future improvements are planned.

The plant of the Idaho Portland Cement Co. at Inkom, Idaho. The quarry and crushing plant are in the right background.

The new San Gully Washer No. 2 of the Southern Phosphate Corp. near Lakeland, Fla.

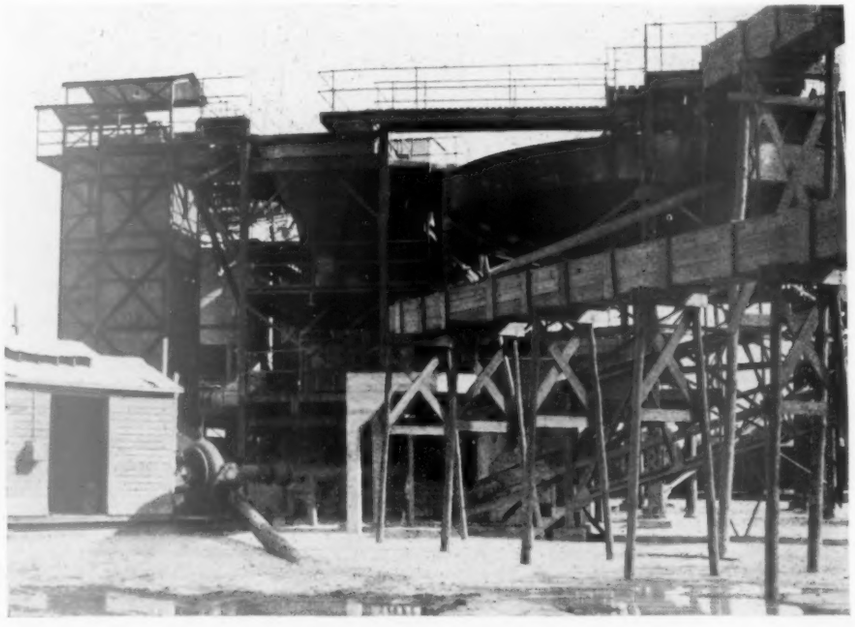
Gypsum, Phosphate, Feldspar Industries Make Important Gains

THIS review of plant and operating developments in the so-called miscellaneous industries is intended to cover the dozens of nonmetallic-mineral producing industries other than Portland cement, lime, aggregates, and by-products which are reviewed separately. Many of these industries are of sufficient importance to justify individual reviews, but space limitations make this impossible. For this reason only the more interesting and important developments in these industries will be covered in this review.

Some of these industries actually experienced a boom during the year. This was true of the feldspar industry which in 1936 passed the 1928 peak and continued its advance in 1937.

One of the new phosphate operations completed in 1937 was the San Gully Washer No. 2 of the Southern Phosphate Corp., which was described in the September, 1937 issue of PIT AND QUARRY. This washer, near Lakeland, Fla., produces about 2,000 tons of washed phosphate daily. This is shipped to the company's drying plant at Ridgewood, 12 mi. from the washing plant.

The deposit is stripped of its overburden at the rate of 700 cu. yd. per hr. by a Bucyrus-Erie electric crawler dragline with a 9½-cu. yd. Page bucket. The matrix is washed down by hydraulic giants into a sump from which it is pumped through a pipeline to the plant.



Another view of the Southern Phosphate Corp. plant showing the bowl classifier at right.

Processing at the plant consists of first screening out the mud balls and clay by means of revolving and vibrating screens. Log-washers further break down the material which is then passed over more Robins vibrating screens. A Hardinge conical scrubber and another screen produce finished coarse phosphate. Two Allen settling tanks and two Dorr Fahrenwald sizers further treat the material that passes through the screens preceding and following the scrubber. Material passing through the screens preceding this equipment is treated in a Dorr hydroseparator followed by three Dorr Fahrenwald sizers. The coarsest material from all the sizers goes to a drag-dewaterer which produces finished fine rock.

The fine product of the sizers goes to another drag-dewaterer and is mixed with flotation reagents. The mixture is then fed to 32 Deister-Overstrom No. 6 concentrating tables. Each table produces concentrates, middlings and tailings. The concentrates are passed to an Allen cone and then to the concentrate loading bin. The middlings are settled out, reconditioned and fed to three more concentrating tables. The concentrate is disposed of as before and the middlings again make the circuit. Tailings from all the 35 tables go to waste. Wilfley pumps are used to handle the table concentrates and middlings and Georgia Iron Works pumps are used in various other places.

The Monsanto Chemical Co. installed four Merrick Weightometers in its new phosphate plant at Columbia, Tenn. The Swift Fertilizer Works, Bartow, Fla., purchased a Page 8-cu. yd. all-electric dragline with a 160-ft. boom.

The Anderson Phosphate Mining Co. completed a small plant near Garrison, Mont., for the dry grinding of rock phosphate. Among other improvements the Read Phosphate Co. at Nashville, Tenn., installed a 12-ft. Gayco separator. The Phosphate Mining Co., Nichols, Fla., installed a Raymond No. 483 bowl mill and a 12-ft. Raymond separator.

The important plant developments in the gypsum industry were confined almost entirely to the two major producing companies. No complete new plants were built, but many existing operations were improved. A recent development in this industry was the purchase by the Celotex Corp. of the capital stock of the Gulf Gypsum Co., which has large deposits of gypsum at Falfurias, Tex. Announcement has al-

The new soda-spar plant of the Western Feldspar Milling Co. at Denver, Colo.

Concentrating tables in the plant of the Southern Phosphate Corp.

so been made by the National Gypsum Co. of plans for the construction of a $2,000,000 insulation fiber-board plant at Mobile, Ala. This company has practically completed an extensive improvement program which has affected all its gypsum and lime plants. The company's plaster mill at Fort Dodge, Ia., was recently destroyed by fire at a loss of about $200,000 and plans for rebuilding it have been announced.

The U. S. Gypsum Co. also suffered from a fire, which destroyed its plaster mill at Heath, Mont. A new reinforced-concrete and brick plaster mill and a concrete-and-steel wallboard plant were built. At Los Angeles the company built an addition to its plant and warehouse at a cost of $175,000.

Two new feldspar plants were built in Colorado in 1937. An article in the December, 1937 issue of PIT AND QUARRY described the progress made by the Western Feldspar Milling Co. on its new plant at Denver, Col., where it has operated a feldspar-grinding plant for years. In 1937 it completed improvements which greatly increased the capacity of this plant which can now produce 45,000 tons annually. In 1937 it also built a new soda-spar and lepidolite plant, which has a capacity of about 5,000 tons annually and is similar in design to each of the three units of the feldspar plant.

Raw spar is fed into a Universal Crusher Co. jaw crusher and is further reduced in an 8-ft. by 60-in. Hardinge conical mill. Dings separators, a vibrating screen and a separator are also used. The finished product is stored in three 216-ton steel tanks.

The company's future plans include the construction of a fluorspar plant in which flotation will be used. The equipment will include a Hardinge mill, a rotary drier, a screw classifier, a filter, etc. Much of this equipment is already on hand. A mica plant is also planned, but details of its design and equipment are not yet available.

The new plant of the Colorado Feldspar Corp., at Canon City, Colo., went into operation early in 1937. It is said to represent an investment of $100,000. A Norblo dust-collector was recently installed in it.

The Consolidated Feldspar Corp. was as usual represented in the year's developments. This company's plant at Topsham, Me., was rebuilt and new crushing, grinding and air-separating equipment installed.

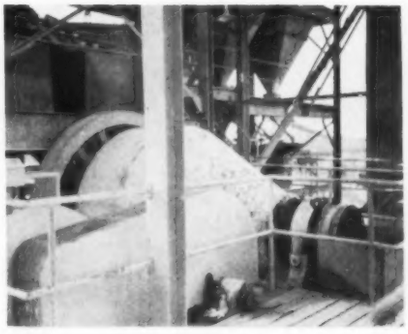
There was renewed activity during the year in the fluorspar industry in the Southwest. Several small test plants were put into operation in New Mexico. The La Purisima Fluorspar Co. made some improvements to its plant at Deming, N. M.

There was considerable activity during the year in the commercial clay industries. Several new plants were built and many others were improved. The Langley, S. C., plant of the Sgoda Corp., which has been repeatedly enlarged during many years, was one of these. This company began the production of washed kaolin in 1934, and in 1937 a Sperry filter press and a battery of Tyler Hum-mer screens were added in this department. In the dry section of the plant a Raymond 5-roller mill with a double Whizzer separator was installed. Stokers were provided for in two rotary driers and a new Valve bag-packer supplemented those in use.

The Filtrol Corp. improved its plant at Los Angeles, Cal., by the installation of a Western Precipitation Corp. Cottrell precipitator. Other improvements are contemplated.

The Albian Kaolin Co., Hephzibah, Ga., installed a Raymond 5-roller mill with a Whizzer separator, twin concentrator dust-collectors, and other equipment.

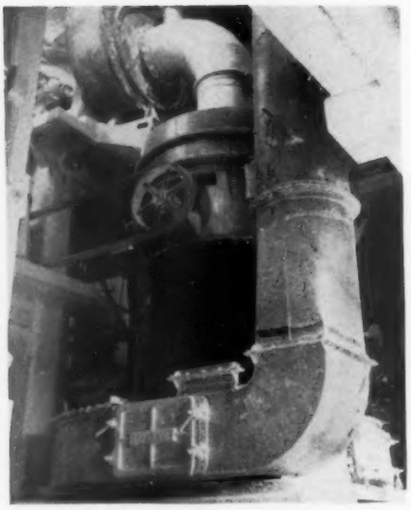
The United Clay Mines Corp. is building a new plant at Sandersville, Ga.



Conical scrubber and screens in the Southern Phosphate Corp. plant.

The new dry-grinding plant of the Anderson Phosphate Mining Co. near Garrison, Mont.

The kaolin plant of the Sgoda Corp. near Langley, S. C. Storage and drying shed is at right.



New high-side roller-mill, with integral double separator in the Sgoda Corp. plant.

The new silica sand plant of the West-Land Security Co., Inc. at Tarbutton, Texas.

tion to its rock-wool plant at Alexandria, Ind.

The McCall Mining Co. recently made its first shipments from its new tripoli-grinding plant near Parsons, Tenn. The Standard Tripoli Co. early in 1937 completed a new tripoli milling and drying plant at Baxter Springs, Kan.

Manufacturers of cements other than Portland were active during the year. The Century Masonry Cement Co., Rosendale, N. Y., built two additional 6,000-bbl. storage silos and added new grinding machinery. The Best Bros. Keene's Cement Co. also enlarged its storage facilities.

The problem of removing iron from silica sand to be used in glass manufacture has always been a difficult one and many glass-sand plants have been forced out of business by their owners' in-

(Continued on page 125)

The talc industry continued the plant-expansion activity begun in 1936. Standard Minerals, Inc., which built a new pyrophyllite plant near Hemp, N. C., in 1936, is building a new grinding plant and making other improvements to cost about $250,000. The Tennessee Mineral Products Corp. is building a new grinding plant at Staley, N. C. Eastern Magnesia Talc, Inc. installed a Raymond 5-ft. Whizzer separator in its plant at Johnson, Vt.

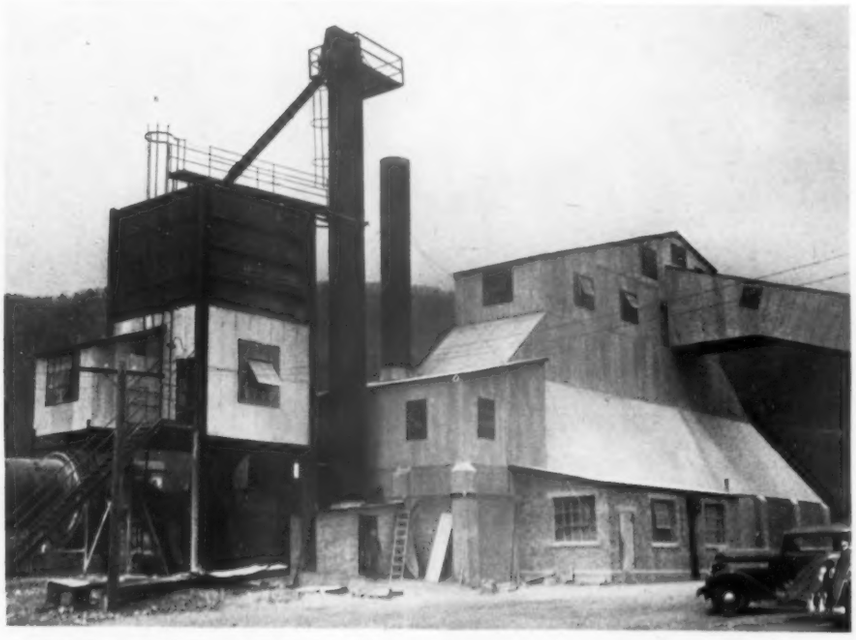
The Vermont Asbestos Corp. at its Hyde Park, Vt., plant added new reinforced-concrete storage silos which were built by the Nicholson Co. Two Merrick Weightometers were installed. The Johns-Manville Corp. recently let contracts for the construction of a new $1,000,000 plant near Long Beach, Cal. Asbestos-cement pipe, shingles and siding and rock wool will be made. This company is now erecting an addi-

The new electric walking drag-line of the Swift Fertilizer Works which has an 8-cu. yd. bucket and a 160-ft. boom.

Lime-Plant Progress . . .

Two Pennsylvania Operations Outstanding Developments of 1937 in This Field.

The new plant of the Chemical Lime Co. near Bellefonte, Pa. At the right are the kiln and the pebble-lime silos. At left is the grinding and shipping department.



At right is the limestone screening and storage building with the kiln-feed bin and the kiln at left. Under this building are the kiln-gas dust cyclones.

NO figures are yet available on the amount of business done by the lime industry in 1937, but there was apparently a marked increase over 1936 which was itself a good year. The lime industry was benefited particularly by the sharp increase in private building. This type of construction compensated for the drop in large governmental or government-financed construction projects which use comparatively little lime.

Lime producers spent large sums during the year in improving and enlarging their operations. Many new plants were built and it is interesting to note that a good proportion of these were rotary-kiln plants of large capacity.

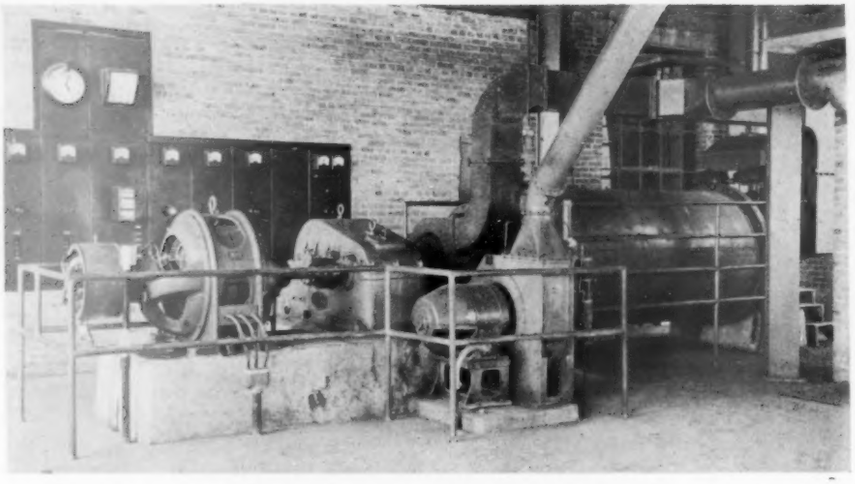
The plant of the Chemical Lime Co. was the first of the large new rotary-kiln plants to go into operation. A complete description of this plant was published in the May, 1937 issue of PIT AND QUARRY. This plant has a capacity of 200 tons of quicklime daily.

The limestone used is secured from a simplified type of shrinkage stope mine which also supplies the company's other operations. Stone is drawn from the stopes through raises into bulldozing chambers from which it is passed through grizzlies into pockets. From these it is fed on a horizontal belt-conveyor. A Traylor revolving screen and 16-in. gyratory crusher in the mine reduces the stone before it is taken out of the 1,000-ft. slope on belt-conveyors. Four Robins vibrating screens and a No. 7½ Traylor gyratory crusher are used to prepare the stone for kiln feed. Four 1,000-ton reinforced-concrete bins are used for storage and stone is reclaimed from these by a tunnel belt-conveyor. A Webster pan-feeder serves the kiln. All the conveyors and elevators in this department were supplied by the Robins Conveying Belt Co.

The Traylor 400-ft. all-welded rotary kiln is said to be the longest rotary kiln ever installed in a lime plant. Its most interesting feature, however, is the provision made for the introduction of secondary air in controlled quantities at selected intervals along its length. This system is said to give close combustion control and to lengthen the flame and calcining zone in such a way as to result in slow calcination of the stone. The stone enters the kiln at a temperature of about 500 deg. F. and in a period of about 3 hr. its temperature is raised to about 2,200 deg. The last 40-ft. section of the kiln is used to give a curing or soaking-pit effect.

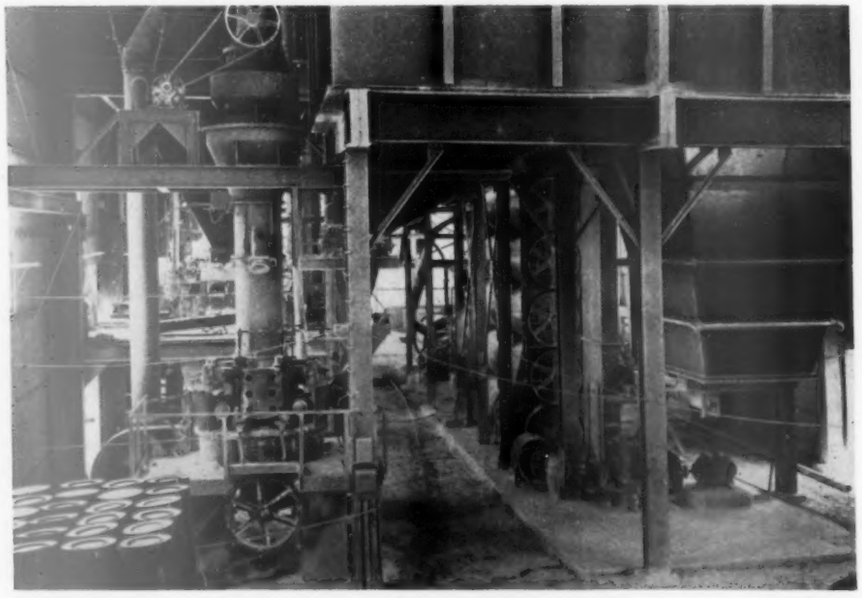
The kiln is 8½ ft. in diameter for the first 300 ft. of its length and in 10 ft. tapers to 7 ft. in diameter for the remaining 90 ft., which forms the preheating zone. General Refractories refractories and Johns-Manville insulation are used. A Buffalo fan supplies the induced draft and draws the hot gases from the kiln into two 11-ft. Kennedy-Van Saun cyclones, which precipitate the dust and release the gas to the atmosphere. A Kennedy-Van Saun pneumatic-conveying system loads the dust into cars for shipment and sale as pulverized limestone.

The kiln is fired with pulverized coal through a Traylor-Cheesman burner. Hot primary air is drawn from the cooler through the Kennedy-Van Saun air-swept ball-mill, which is



The ball-mill used for dust firing of the kiln in the Chemical Lime Co. plant. At left are the mill fan, drive, motor and switchboard.

The new plant of H. E. Millard near Annville, Pa. At the the left are the stone-storage silos and skip. The coal and pebble-lime storage silos are at right.



The mill room of the Millard plant. At left is the quicklime pulverizer with packers in background. At right is the continuous hydrator.

equipped for direct firing, to the inner pipe of the burner. A Buffalo fan draws hot secondary air from the cooler and blows it into the kiln through the outer pipe of the burner.

The calcined pebble lime is discharged from the kiln into a 7-ft. by 42 1/2-ft. Traylor rotary cooler of a new type. Lime is indirectly cooled in seven tubes extending the length of the cooler. Cooling air enters the cooler shell around the tubes.

Pebble lime is sized by two Stephens-Adamson vibrating screens before it is discharged into the three 1,400-ton storage silos. Holmes spiral chutes eliminate breakage of the lime in the silos. Sized pebble lime is reclaimed from storage on a belt-conveyor from which it can be discharged direct to a loading conveyor. The lime can also be diverted to a Stephens-Adamson vibrating screen from which the oversize material goes to the same loading conveyor. Material passing through this screen can be resized over a Tyler-Hum-mer screen or ground in a Kennedy-Van Saun ball-mill in closed circuit with a 10-ft. Gayco separator. Stephens-Adamson belt-conveyors and Redler elevators and conveyors are used throughout this department.

The outstanding complete commercial lime plant of the year was the one built by H. E. Millard near Annville, Pa. This plant can produce from 125 to 150 tons of lime daily and is unusually flexible in design to make possible the manufacture of a wide variety of products. This plant went into operation May 15, 1937 and was completely described in the August, 1937 issue of PIT AND QUARRY.

Stone for this new plant can be supplied from either of two commercial crushed-stone plants on the same property. These plants were improved by the installation of new Kennedy-Van Saun crushers and vibrating screens. Stone can be supplied to the lime plant either by a series of belt-conveyors or by trucks and a Link-Belt skip hoist. These can discharge their loads into the kiln-feed bin or into two 2,000-ton concrete silos from which the stone is returned by a belt-conveyor to the same skip hoist.

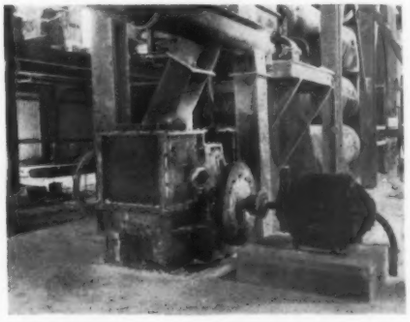
An F. L. Smidth table-feeder serves the 290-ft. F. L. Smidth rotary kiln, which is similar in design to the kilns supplied by this company to numerous cement plants in recent years. This kiln is 6 ft. 8 in. in diameter for 187 ft. of its length from the feed end and in a 10-ft. section tapers to 8 ft. 2 in. in diameter for the remaining 93 ft. For 56 ft. near the feed end this kiln is divided into quadrants to facilitate heat exchange. Except for this section, the entire kiln is lined with Harbison-

Walker refractories. Johns-Manville insulation is used. Attached to the kiln shell is a Unax cooler, consisting of ten 30-in. diameter cells equipped with chains.

The kiln draft is supplied by a Buffalo fan which draws the kiln gases from the dust chamber and exhaust into a 100-ft. concrete stack. This stack and all the silos in this plant were built by the M. A. Long Co. A Smidth Atox mill is used for direct-firing of the kiln.

Pebble lime is discharged from the Unax cooler on a Smidth Skipulter. A Link-Belt skip-hoist can discharge the lime either direct to storage or on a Link-Belt vibrating screen from which it can be taken to storage or on a belt-conveyor running to the hydrating and grinding department. The pebble-lime storage consists of six 1,000-ton concrete silos with four 200-ton interstices.

Tunnel belt-conveyors reclaim pebble lime from storage and return it to the flow to the finishing department.



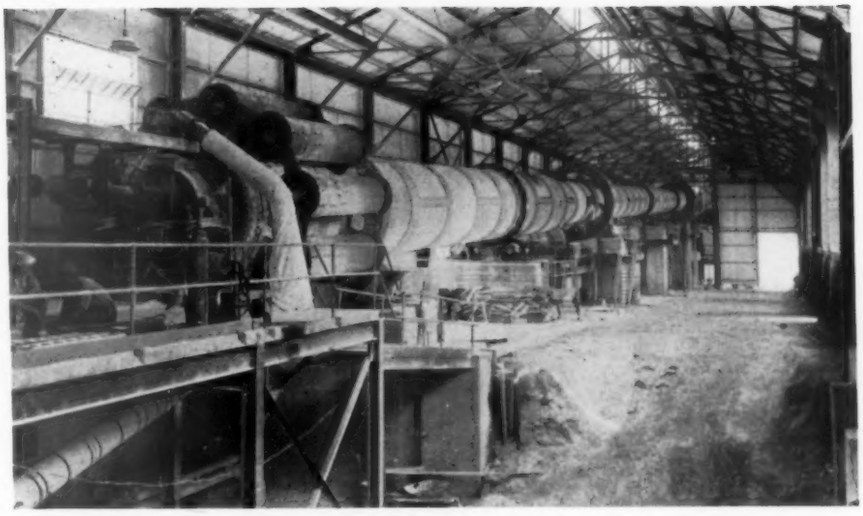
The hammer-mill which is used for final reduction of quicklime before it is hydrated.

The pebble lime can be discharged direct on a shuttle belt-conveyor for loading direct into special bulk-material cars or to a Manierre box-car loader. A Link-Belt vibrating screen can grade the pebble lime into three tanks for car loading with the same equipment.

The fine lime coming from this screen can be discharged into two bins, one of which feeds a Smidth Atox mill with an attached separator. The pulverized quicklime can be loaded in bulk through a spout into cars or it can be settled out by a cyclone into a packer-feed bin.

The lime in the second bin can be discharged into a Jeffrey hammer-mill or can by-pass it. In either case it goes to a surge bin from which a Hardinge volumetric feeder discharges the quicklime into a Kritzer 12-ton continuous hydrator. The hydrated lime goes to a 14-ft. Gayco separator from which the fines are transferred by a Kennedy-Van Saun pneumatic-transport system into a packer-feed bin.

The coarse hydrated lime from the separator is discharged into a Kennedy-Van Saun air-swept ball-mill. The mill product can be recirculated through the separator or can be settled out by cyclones into a packer-feed bin. Reversible shuttle belt-conveyors are used for loading sacked products from the three packers into cars or trucks. These conveyors and the other belt-conveyors and elevators in this plant were supplied by the Link-Belt Co.



The 290-ft. rotary kiln in the Millard plant. At left is the 10-cell cooler and below it is the reciprocating clinker conveyor.

The outstanding development in the lime industry on the Pacific Coast was the new plant of the California Chemical Corp. at Newark, Cal. This firm is a subsidiary of the Westvaco Chlorine Products Corp. This new plant, which went into operation in November, is essentially a chemical operation, using oyster shells and sea-water bittern from San Francisco Bay as raw materials. Its daily capacity, when operations are in full swing, will be about 100 tons of quicklime, 60 tons of gypsum and 50 tons of magnesium oxide, chemical oxide, dead-burned magnesite or periclase as desired. About 65 tons of the lime will be used daily to precipitate magnesia from salt-water bittern. The remaining 35 tons of lime and the gypsum will be marketed.

The shells are dredged in the bay and brought to the plant in barges through a 6,500-ft. canal. A gantry crane unloads them. The shells are calcined in a 7 1/2-ft. by 315-ft. Traylor all-welded rotary kiln followed by a Traylor rotary cooler. The lime can be transferred by a Fuller Airveyor system into quicklime-storage tanks, a quicklime shipping bin or into a bin feeding the magnesia system.

Lime for processing is passed through a Raymond mill and slakers where magnesium-chloride brine is added. The resulting mixture of magnesium hydrate and calcium chloride goes into a Dorr thickener, where the calcium chloride is drawn off for use in the gypsum operations. The magnesium-hydrate sludge is pumped through a series of five Dorr thickeners and into three storage tanks, from which it is

The 315-ft. lime-kiln and the 190-ft. magnesia kiln in the California Chemical Corp. plant. At right are some of the chemical-treating tanks.

The new plant of the California Chemical Corp. at Newark, Cal., in the final stages of construction. At the left is the shell storage. In the foreground is the 315-ft. rotary lime kiln.

passed through a mixer in which silicon oxide, alumina, iron ore, lime, or any other desired ingredient can be added in powder form to make the various magnesia products listed above.

The product of the mixer is passed through an Oliver filter and then into an 11-ft. by 190-ft. Traylor kiln followed by a rotary cooler. The magnesia product of this kiln goes to storage bins from which it may be diverted to a crusher for making specific grades. This material then goes to the railroad loading department.

The calcium chloride for gypsum manufacture is mixed with sea-water bittern, the reaction producing magnesium chloride. Gypsum is precipitated in two Dorr thickeners arranged in series. The remaining liquid (magnesium chloride) is passed into a storage tank for use in the magnesia system already described. The crude gypsum is passed through an Oliver filter and is dried in a Raymond cage-type kiln mill. The finished product is then stored for shipment.

The new rotary-kiln plant of the Bluff City Lime & Stone Co., at Mosher, near St. Genevieve, Mo., went into operation early in 1937. It ranks with the best in existence both in design and in the equipment used. Included in the equipment are two Allis-Chalmers 300-ft. rotary kilns and shaker coolers, Raymond direct-firing bowl mills and air separator, Allis-Chalmers crushers and screens, and Link-Belt conveyors and elevators.

The mushroom-like growth of paper mills in the South, especially along the Atlantic Coast, resulted in a considerable increase in the lime-productive capacity in that area. This added capacity is non-commercial and will not affect the business of commercial lime-producers in the South. It is expected that some of the new paper plants now under construction will buy the lime needed in their processes.

Typical of these new plants is that of the West Virginia Pulp & Paper Co. at North Charleston, S. C., which was described in the June 1937 issue of PIT AND QUARRY. Two Traylor rotary kilns are used in this plant. Two 8½-ft. by 170-ft. Traylor rotary kilns and Dorr settling equipment are used in the new plant of the Champion Pulp & Paper Co. near Houston, Tex. A 11-ft. by 250-ft. Allis-Chalmers kiln was installed by the Southern Kraft Co. at Spring Hill, La.

The Gibsonburg Lime Products Co. in 1937 completed a 3-year improvement program at its Gibsonburg, O., plant. Previous improvements had increased the plant's lime hydrating and grinding capacity and made possible the manufacture of additional products. The latest installations have increased the lime-burning capacity of the plant and lowered its operating costs. In the quarry a McLanahan & Stone single-roll crusher and a Tyler

The beater mill with integral separator used to grind quicklime in the California Chemical plant.

Ty-Rock screen prepare the stone for the kiln. A 260-hp. National Superior Diesel-engine generating set was also installed. This drives the quarry equipment in the daytime and the milling and hydrating equipment at night. Four new Arnold & Weigel 11-ft. by 24 1/2-ft. vertical kilns were added to those already in use. All these kilns are equipped with Arnold & Weigel Ward automatic stokers and pneumatically-operated draw shear gates.

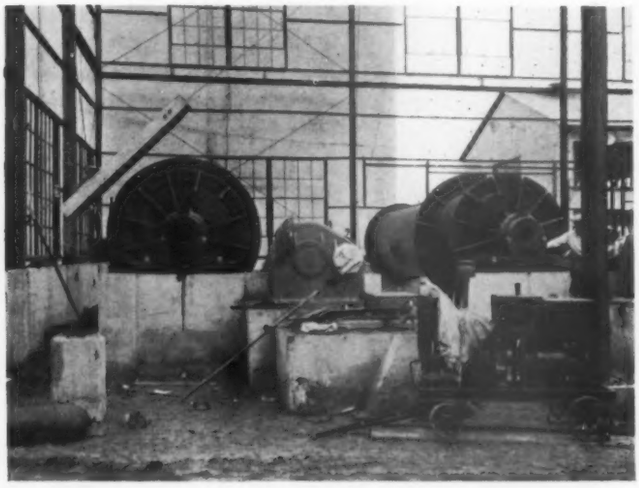
Improvements of less importance

(Continued on page 124)

The plant of the Gibsonburg Lime Products Co. at Gibsonburg, O. At right is the addition to the kiln building housing the new kilns.

The new plant of the Gulf Portland Cement Co. on the ship channel near Houston, Texas.

Another view of the new plant with shell bin and clay washer in left foreground.



The two finish-grinding tube-mills with speed-reducer in foreground.

Another view of finish mills with transformer house in background.

New Gulf Portland Cement Co. Plant Nearing Completion

by W.E.Trauffer

THE new plant of the Gulf Portland Cement Co. near Houston, Tex., is rapidly nearing completion and is expected to be in operation by March 1. Most of the large machinery has already been installed and the remainder of the equipment is either on hand or ordered. This plant is located on the north side of the Houston Ship Channel, at the end of the Morgan Line slip, 10 mi. east of downtown Houston, and has access to the Gulf of Mexico. The raw materials will be oyster shells and clay and the products will be standard and high-early-strength Portland cements. Masonry cement may also be made later. Ground was broken for this plant in January, 1937.

Even for an 850-bbl. plant, comparatively small as cement plants go,

The new crane which will be used to unload and rehandle shell and clay to the plant. This machine is shown excavating for the new office and laboratory building.

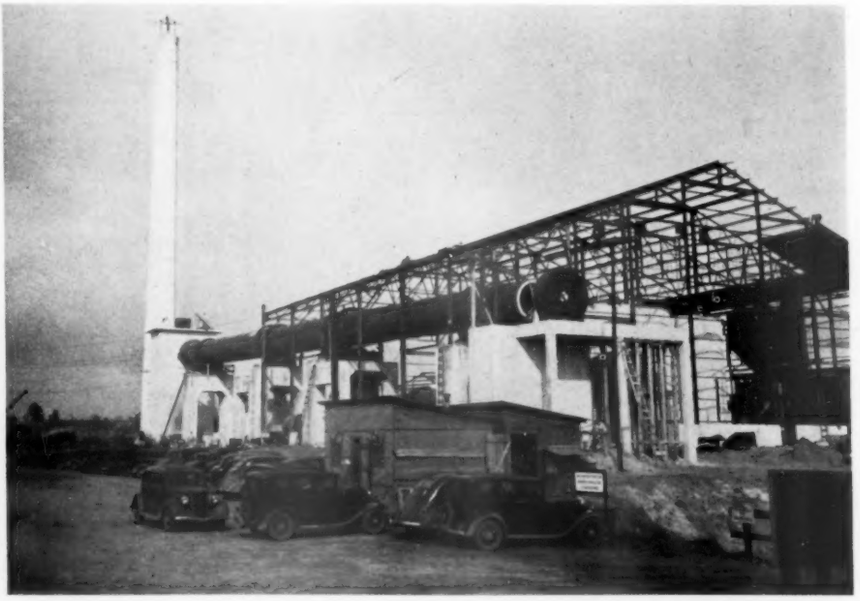
this new plant is as simple and compact as any in the industry. The handling of raw and finished materials will be kept at the minimum. Flexibility will be another feature and wherever possible all the major equipment will operate in closed circuit. The low initial cost of this plant, the low grinding cost inherent in the use of oyster shells and clay as raw materials combined with the above factors are expected to make this an unusually economical operation.

The oyster shells for this plant will be supplied by Horton & Horton, from reefs in Galveston Bay, about 50 mi. from the plant. These shells have a high calcium-carbonate content and are washed and screened before delivery. A Thew Lorain crawler crane fitted with a ¾-cu. yd. clam-shell bucket and powered by a Waukesha gasoline engine will be used to transfer the shells from barges into a 20-ft. square wooden hopper or into stock-piles. (This crane has been used in excavating for the plant and in the erection of the buildings and equipment.) A Jeffrey apron-feeder will discharge the shells on a 16-in. by 58-ft. Jeffrey belt-conveyor in a concrete tunnel. A 40-ft. Jeffrey chain-bucket elevator is to discharge the shell into a steel hopper in the raw-grinding department.

A Jeffrey-Traylor 18-in. by 5-ft. vibrating feeder will discharge the shells through the gudgeon of the 7-ft. by 9-ft. Allis-Chalmers wet-grinding ball-mill, the product of which mill will be discharged into a concrete sump from which a 4-in. Morris pump will feed it to a 4-ft. by 7-ft. Jeffrey-Traylor electric vibrating screen equipped with 20-mesh wire cloth. The material retained on this screen will be returned to the mill. The product passing through the screen will be measured by a Kennedy-Van Saun Ferris-wheel feeder through a spout into a 7-ft. by 22-ft. tube-mill. The clay slip will be fed into this mill through the same spout.

The clay will also be supplied by Horton & Horton, and is practically free from magnesia. It will probably be received by railway and will be unloaded by the same Thew Lorain crane either into stock-piles or into a clay wash-mill. This mill is of original design and is 16 ft. in diameter and 9 ft. deep. Agitation of the clay will be accomplished mechanically by means of harrows suspended by chains from a revolving spider. A 2-in. Wilfley centrifugal pump will transfer the clay slip into a steel storage tank in the mill building. This tank is of the pachuca type 13 ft. 6 in. in diameter and 14 ft. high with a conical bottom. Another 2-in. Wilfley pump will feed the slip to a Kennedy-Van Saun Ferris-wheel feeder, which will carry the clay slip into the tube-mill already described through the same spout with the shell slip. The overflow from the clay-slip feeder will return to the storage tank.

The slurry will flow from the tube-mill into a sump from which a 2-in. Wilfley pump will transfer it to four tanks. These reinforced-concrete tanks are 14 ft. in diameter and 20-ft. high and are equipped for air agitation. After sampling the slurry will be drawn from any two of these tanks in the desired proportions and transferred by a 2-in. Wilfley pump to either of two dual blending tanks. Each of these tanks consists of two 13-ft. diameter by 20-ft. concrete tanks from which the separating partition has been omitted. Another 2-in. Wilfley pump will transfer the blended slurry to the slurry-storage tank, which is formed by four 13-ft. diameter by 20-ft. concrete tanks from which the partitions have been omitted. Yet another 2-in. Wilfley pump will transfer the slurry to the Kennedy-Van Saun Ferris-wheel kiln feeder from which the overflow will



Another view of the plant showing the 220-ft. rotary kiln and the 165-ft. concrete stack.

return by gravity to the storage tank.

The 8-ft. by 220-ft. rotary kiln was made by joining two 110-ft. kilns, the two tires and the ring gear of each kiln remaining in place. The kiln is driven by two 40-hp. Allis-Chalmers electric motors synchronized through balanced resistors. Each drive consists of a Philadelphia speed-reducer and a train of gears. Huron seal rings are used on both ends of the kiln, which is lined with Mexico refractory material. At the feed end is a ring of feed blocks followed by 60 ft. of 6-in. cold-zone blocks, 90 ft. of 6-in. hot-zone blocks, 60-ft. of 6-in. Aluminex, 7 ft. 8 in. of 9-in. hot-zone blocks, and a row of nose blocks. There will be a 60-ft. regenerative chain system in the feed end of the kiln.

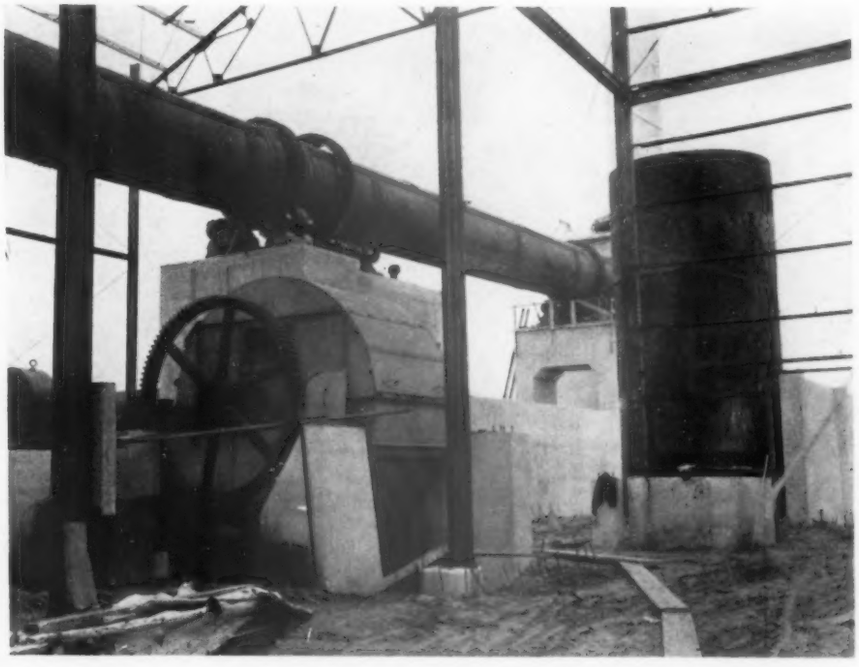
The kiln will be fired with natural gas through a Tate-Jones burner. Primary air will be drawn from the cooler by a Sturtevant fan. The kiln will operate under natural draft. A brick-lined concrete dust chamber with clean-out doors connects the kiln to the 7-ft. inside diameter by 165-ft. concrete stack. A damper in the breeching between the dust chamber and the stack will be operated by an A. W. Cash automatic damper control.

The clinker will drop through a brick-lined chute into the 6-ft. by 120-ft. rotary cooler. This cooler is unusually long in relation to the kiln and was formed by joining two 6-ft. by 60-ft. rotary coolers. Like the kiln, it has four tires and is driven through the two original ring gears by two 20-hp. motors operating in synchronism. The first 60 ft. of the cooler is lined with 6-in. blocks and the remainder has lifter channels. A Huron seal ring is used on the feed end of the cooler.

The cooled clinker will be carried by a Jeffrey drag-chain conveyor to a 30-ft. Jeffrey bucket-elevator. This will discharge the clinker as desired either into a finish-mill feed bin or to the top flight of a Jeffrey drag-chain conveyor which will distribute it in a 30-ft. by 80-ft. concrete-walled storage. This storage will act only as a surge between the kiln and the finish mills. The bottom flight of the same conveyor will reclaim clinker from storage to the elevator already mentioned.

Gypsum will be received in railway cars and will be unloaded into narrow-gage cars in which it will be transferred to an elevator feeding a 13-ft.-diameter by 32-ft. steel tank in the corner of the clinker-storage building. The same elevator is to transfer the gypsum from storage into a finish-mill feed bin.

A Jeffrey No. 43 Waytrol feeder will be used for gypsum and an F. L. Smidth table-feeder for clinker. These feeders will serve the No. 85 Smidth Kominuter for the first stage of grinding. The mill product will be transferred by a 12-in. by 12-ft. screw-conveyor, a Jeffrey 30-ft. elevator and a 12-in. by 25-ft. screw-conveyor in series to a 4-ft. by 7-ft. Jeffrey-Traylor vibrating screen. The material retained on this screen is to be returned into the Kominuter.



The mill to be used for the first stage of clinker grinding with kiln in background.

The minus 30-mesh product will be discharged into hoppers over the two 5-ft. by 22-ft. finish-grinding tube-mills. Two 5-in.-diameter by 5-ft. Jeffrey-Traylor tubular vibrating feeders will serve these mills.

The product of each mill will be carried by a 12-in. by 16-ft. screw-conveyor to a bucket-elevator feeding a Raymond 14-ft. separator having a double Whizzer. The coarse material from the separator is returned by gravity to the tube-mills. The product of the separator will be transferred to storage by a 4-in. Fuller-Kinyon Type H pump.

The cement will be stored in four reinforced concrete silos, each 24 ft. in diameter and 60 ft. high inside, the inclosed star bin, and three pocket bins. The silos have conical steel bottoms, the star bin has a sloped square steel bottom and the pocket bins have concrete bottoms. Cement will be reclaimed from all these silos and bins by a wheel-mounted Fuller-Kinyon 6-in. Type B portable unloader. Fuller Co. rotary valves will be used under each of the eight openings.

A modern and attractive building is now under construction to house the company office and the physical and chemical laboratories. This building will consist of two stories and a basement and is being built of Dunbrik concrete bricks stuccoed on the outside and plastered on the inside. In the basement will be a kitchen, a cafeteria and a private dining room. The general offices and laboratories will be on the first floor and the executive offices on the second floor. Each department will be separately air-conditioned.

The laboratories will be completely equipped for all the necessary tests. The equipment will include a Wagner Turbidimeter, an Autoclave, a Southwark-Emery compression tester, a Shapco atmospheric cabinet, etc. A temporary laboratory is now being used pending the completion of this building.

Complete machine and repair shops are located in one building, which was the first to be completed. The equipment includes three lathes, two drill presses, a power hammer, a key seater, a bolt machine, a shaper, a forge, etc. This equipment has been invaluable in the erection of the buildings and machinery and in the fabrication of much of the incidental equipment. Compressed air for all the operations will be supplied by a Chicago Pneumatic 250-cu. ft. per min. compressor and an Ingersoll-Rand 600-cu. ft. per min. compressor in this building.

Some of the officers and officials of the Gulf Portland Cement Co. Left to right: Kent B. Diehl, president and general manager; Thomas B. Douglas, secretary, superintendent and technical manager; J. M. Davidson, mill foreman; Geoff A. Saeger, chief chemist and assistant superintendent.

A separate concrete building houses the three Allis-Chalmers transformers, which will reduce 12,000-v. current to 440-v. for all the electric motors. Three other transformers will supply 110-v. current for light. Motor-generator sets will supply direct current for the electric vibrating screens and feeders.

Modern locker and shower rooms are located in another building.

The officers and staff of the Gulf Portland Cement Co. have almost without exception had long experience in the cement industry. Kent B. Diehl, president and general manager, joined the Ash Grove Portland Cement Co. in 1926 as special engineer and later became director of special-cement sales. In 1930 he joined the Dewey Portland Cement Co. as field engineer, specializing in the development and sales of masonry and high-early-strength cements. Mr. Diehl left this company in October, 1936 to form the Gulf Portland Cement Co. and to get plant construction under way. The other officers are: F. M. Corzelius, vice-president; Thomas B. Douglas, secretary; R. M. Shaw, treasurer; Dan J. Morse, assistant secretary and assistant treasurer.

Mr. Douglas was formerly technical manager for the Dewey Portland Cement Co. and is here the plant superintendent and technical manager. Geoff A. Saeger is chief chemist and assistant superintendent. Mr. Saeger has been connected with the cement industry since 1912 as chief chemist, chemical engineer and superintendent of various companies. He is a member of Committee C-1 on cement of the A.S.T.M. J. M. Davidson, mill foreman, has had 25 years of cement-plant experience and was formerly with another Houston cement plant. F. A. Lee is assistant chemist.

The plant was designed by the Burrell Engineering & Construction Co. in co-operation with the Gulf Portland Cement Co. All the construction, both steel and concrete, is being done by the Austin Bridge Co. under the Gulf Company's supervision. This company also built the bulkhead and dock at the head of the slip. Concrete is used wherever possible and slip-form construction was used on the tanks, silos and the transformer house. Horton & Horton 3,000-lb. ready-mixed-concrete was used throughout. All the exposed concrete is finished for better appearance and all the steel is painted. Fenestra steel windows, Robertson ventilators and Tennessee Coal, Iron & Ry. Co. corrugated-metal roofing and siding are used throughout. The Texas Concrete Chimney Co. built the kiln stack. Natural gas is to be purchased from the Houston Gas Co. and electricity from the Houston Power & Light Co.

New equipment is being supplied by the following companies:

Bindicator Co. — Bindicators for controlling both the high and the low levels of material in the shell hopper and bin, in the clinker and gypsum bins over the Kominuter and in the final tube-mill feed bins.

Foote Bros.—Speed-reducers for all the bucket-elevators and belt-, screw- and drag-chain conveyors.

Fuller Co.—Portable 6-in. cement unloader, 4-in. Type H pumps and rotary cement valves.

Huron Industries Co.—Seal rings for the kiln and cooler.

Jeffrey Mfg. Co. — Belt-conveyor idlers and drives and Jeffrey-Traylor electric vibrating screens and feeders.

Mexico Refractories Co.—All kiln and cooler refractories.

Morris Machine Works—The shell-slip pump.

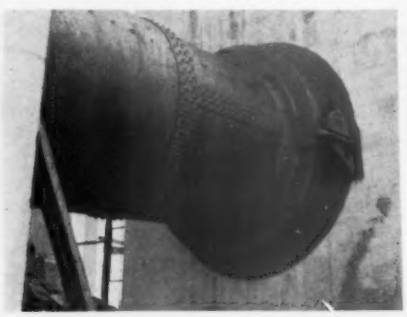
Philadelphia Gear Works — The gear-reducers driving the kiln, cooler and grinding mills.

Raymond Bros.—The separator in the finish-grinding department.

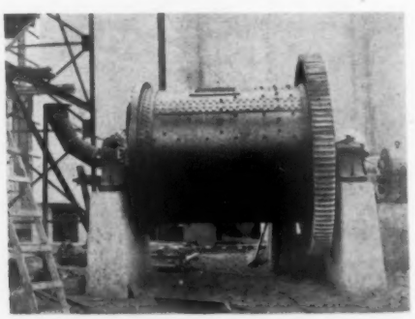
Thew Shovel Co.—The clay and shell handling crane.

Wilfley Co.—The centrifugal pumps used to handle the clay slip and slurry.

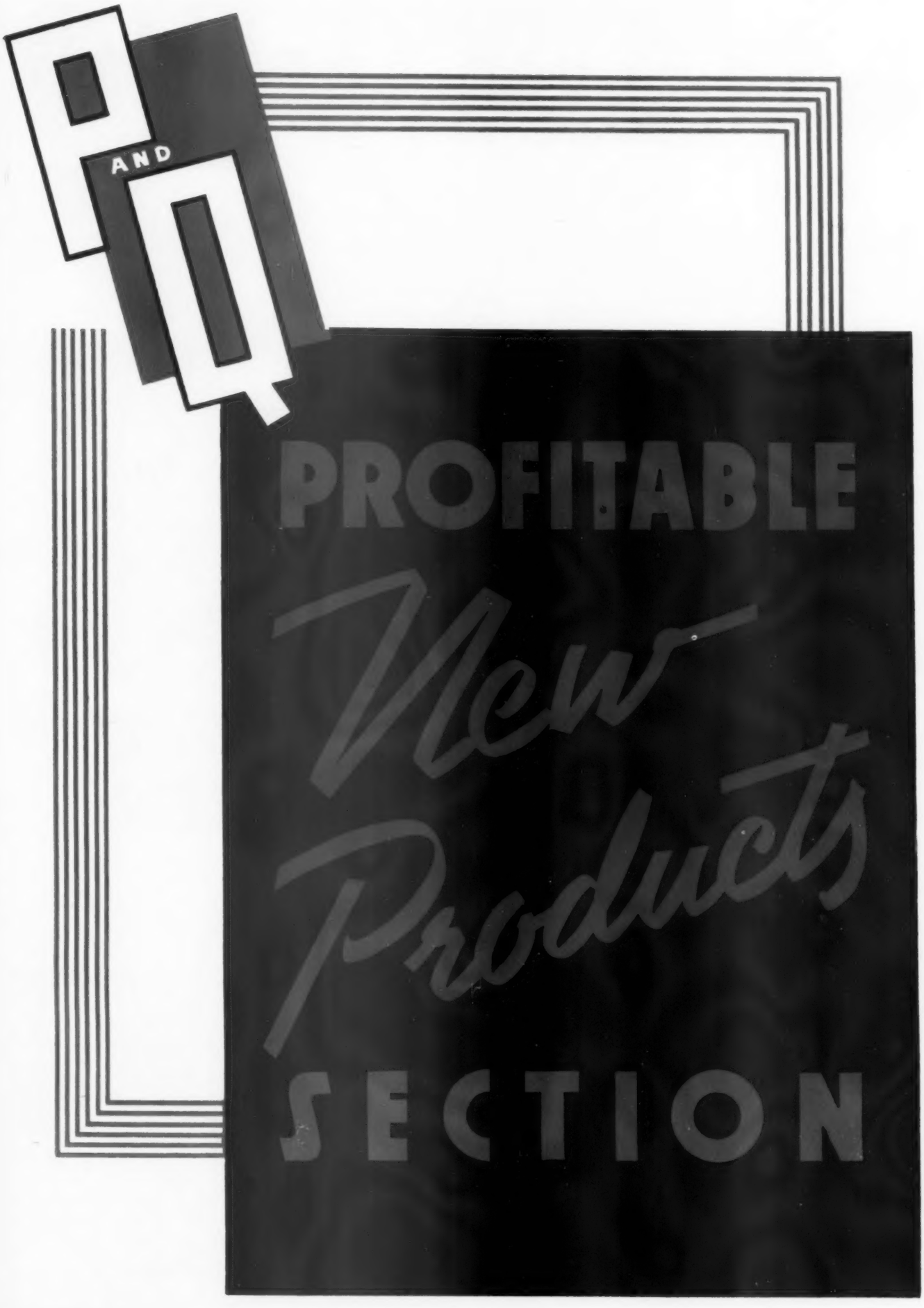
The seal ring on the feed end of the kiln with dust chamber and stack.



The seal ring on the feed end of the 120-ft. rotary clinker cooler.



The preliminary raw-grinding ball-mill for oyster shell.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SECTION

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• Among the many improvements in design of the new Blaw-Knox 3½ and 4 cu. yd. TRUKMIXERS are:—

● **DRUMS AND MIXING BLADES** of manganese alloy steel for greater strength and resistance to abrasion.

● **ACCURACY OF WATER MEASUREMENT** during transit regardless of truck position. Water splash in measuring tank does not effect accuracy.

● **FASTER AND MORE THOROUGH MIXING** with deeper mixing blades. End to end mixing action provided by openings between adjacent blade sections.

● **EASY TO KEEP CLEAN.** No projections inside the mixing drum for concrete to adhere to and build up.

● **TIGHT** Charging and Discharge **DOORS.** Machined steel doors and machined cast steel door seats—replaceable.

● **SEALED BEARINGS AND ROLLERS** (Oversized) for support of mixing drum and its load keep out concrete and dirt.

● **SAFE GAS TANK** located on catwalk of mixer, accessible for filling, away from the engine.

● **POSITIVE CONTROLS.** Dual controls front and rear include anti-friction bearings at pivot points, stay in adjustment.

The Blaw-Knox line of TRUKMIXERS is *complete* with all sizes from 1 to 4 cu. yds. inclusive, and Agitators from 1½ to 6 cu. yds. inclusive.

BLAW-KNOX provides one dependable source for all ready mix plant equipment, including Truck Mixer Loading Plants; Wet Mix and Shrink Mix Plants with storage bins and measuring batchers for aggregates, cement and water, equipped with loading conveyors.

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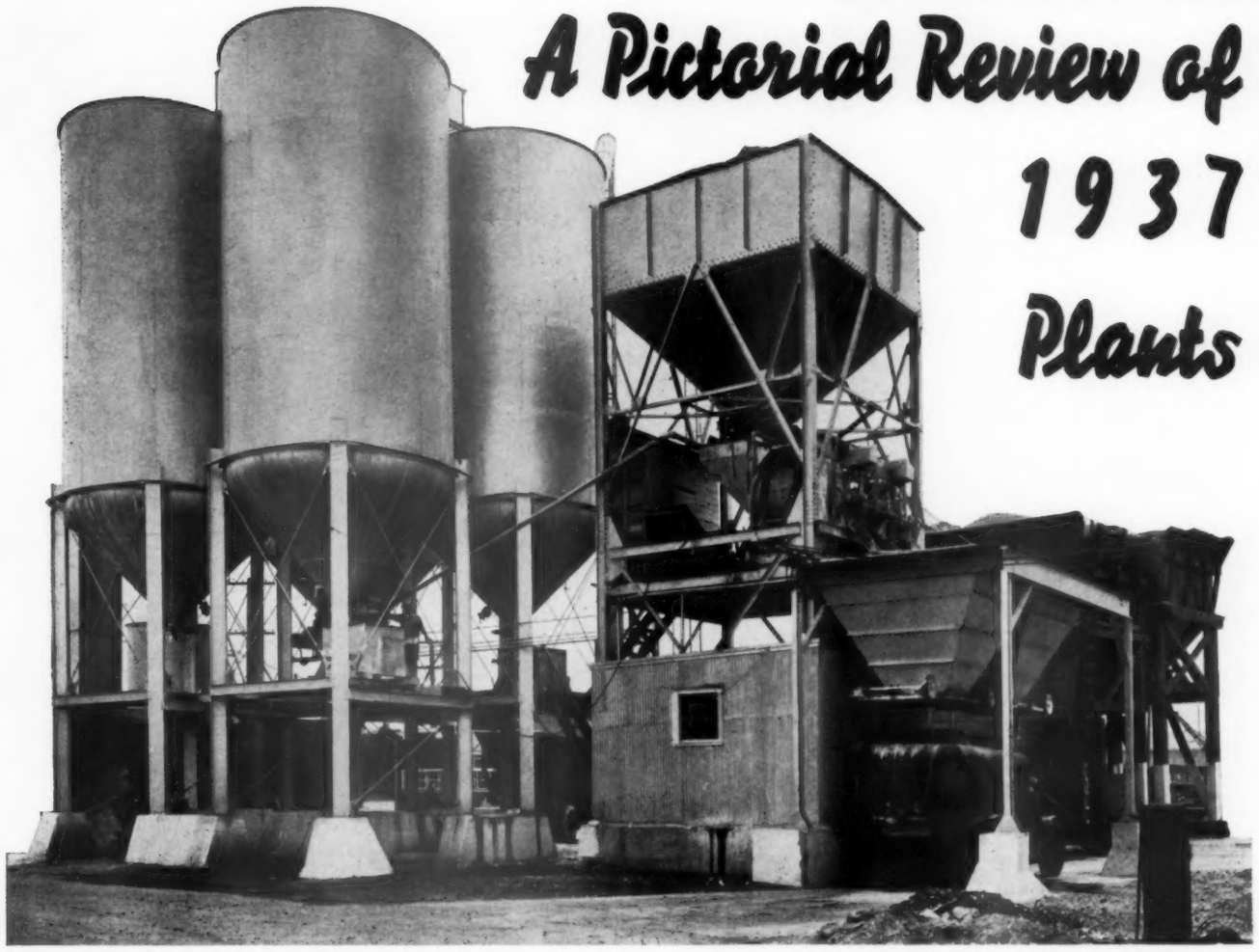
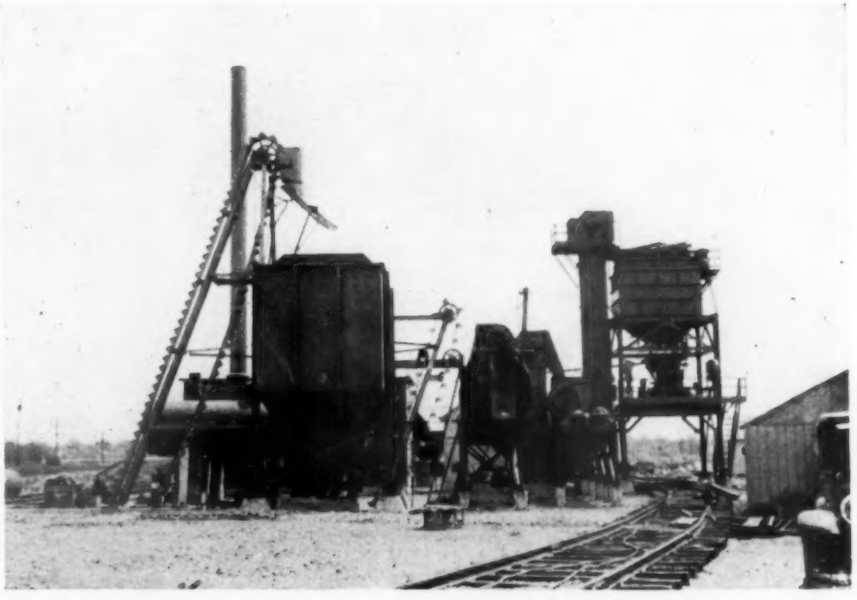
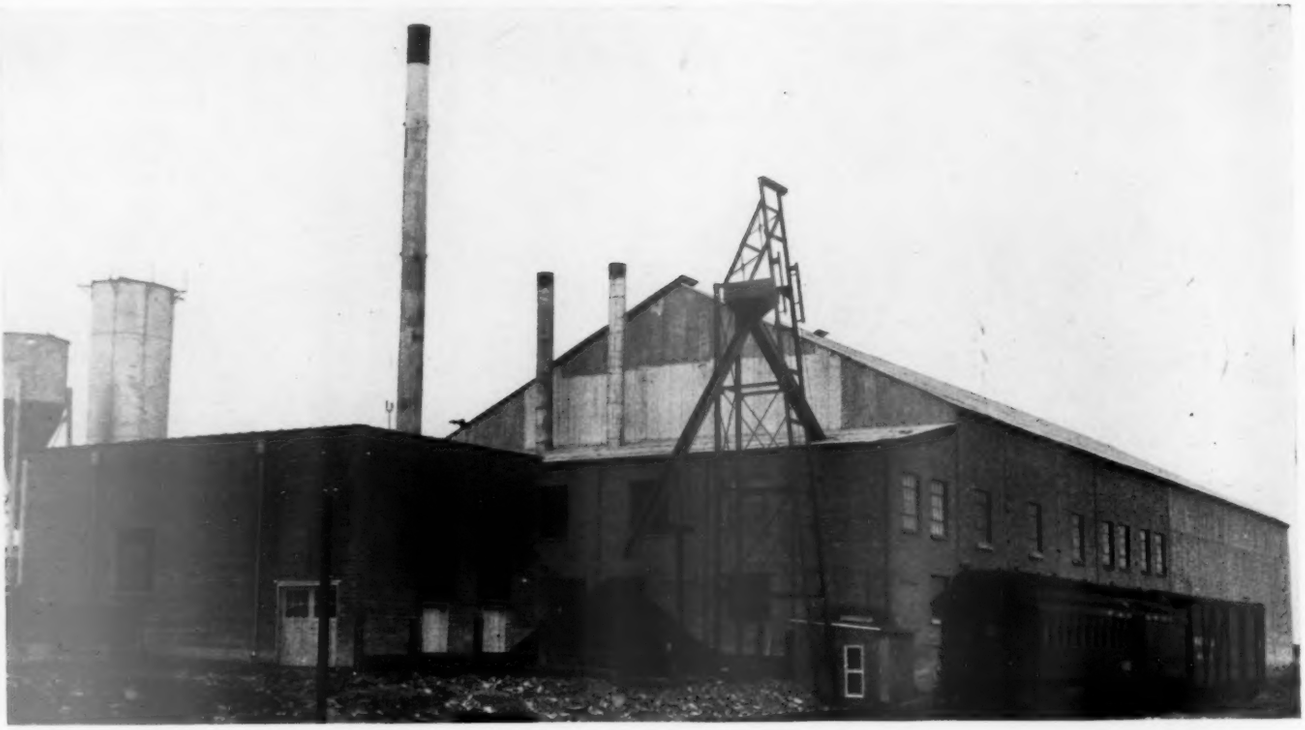
A Pictorial Review of 1937 Plants



Probably the greatest growth in the new-product industries in 1937 was in the field of lime putty. Among numerous installations the one pictured above, owned and operated by the Colonial Sand & Stone Co., New York, N. Y., was the largest. Located at Astoria, L. I., it has a capacity of 600 cu. yd. per 8-hr. day and went into service July 1, 1937. The four aging tanks have a total capacity of 20,000 cu. ft. of putty. In addition, license rights to the Brooks-Taylor process were granted and lime-putty plants erected during the year by the following concerns: Richter Concrete Corp., Cincinnati, O.; Ever Ready Mixed Mortar, Inc., Houston, Tex.; and Jahncke Service, Inc.; New Orleans, La. The last-named plant has just gone into operation.

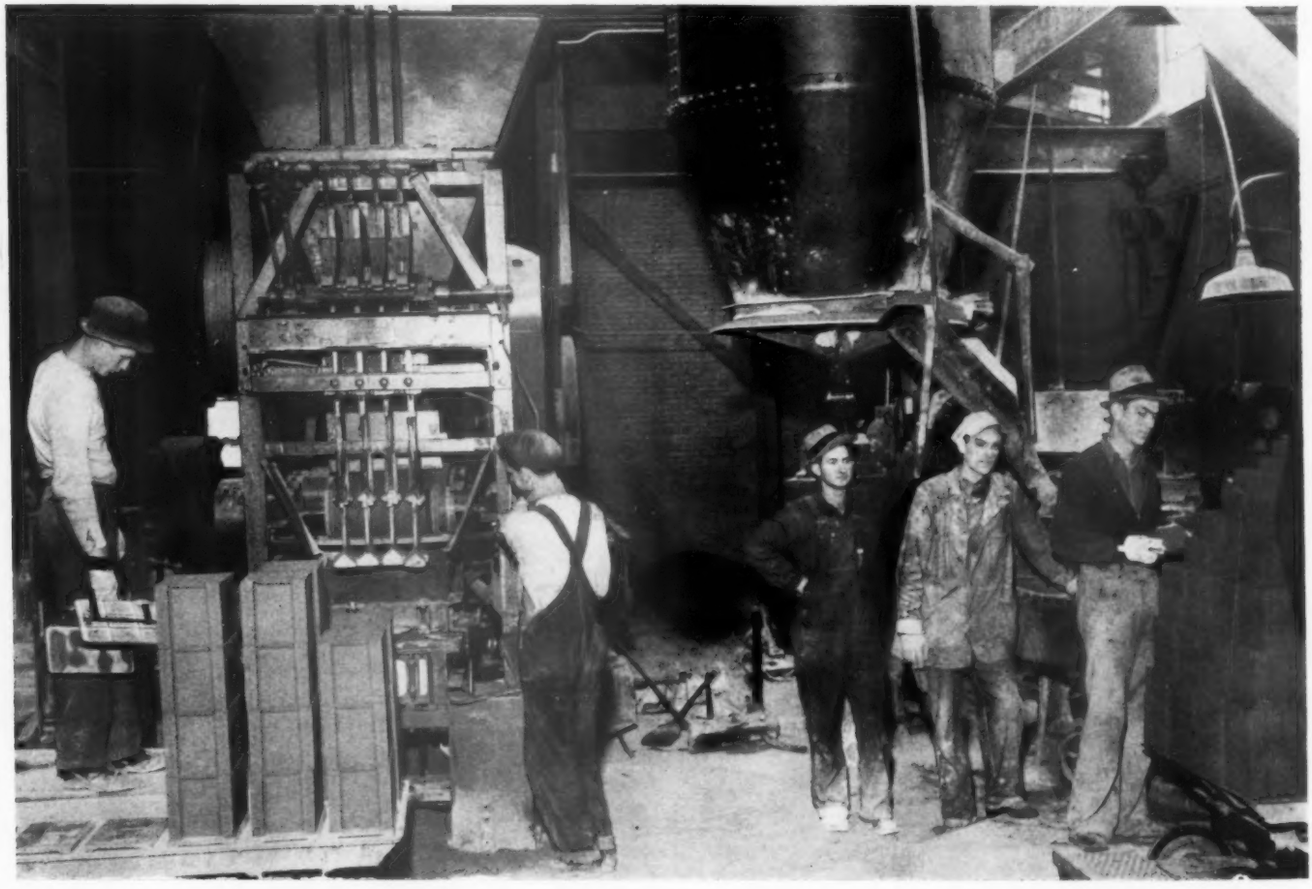


Illustrated at the right is the aggregate-bituminizing plant erected last summer at Middle Point, O., by the Maumee Asphalt Paving Co., Toledo, O. The installation has a daily capacity of 500 tons of finished material which meets specifications of the Ohio Highway Dept. Much of the equipment, including the rotary driers, was supplied by Hetherington & Berner Co., Indianapolis, Ind. Aggregates are sized at the plant by a Symons vibrating screen.



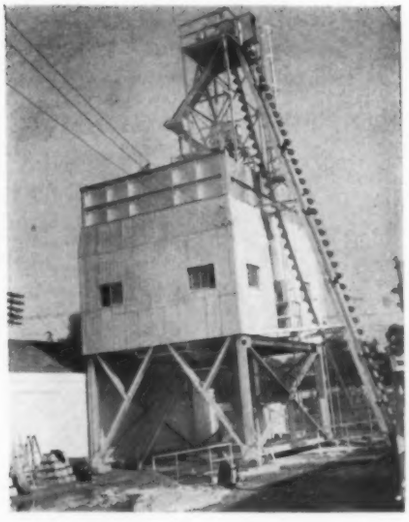
ABOVE—The plant of the Superior Rock Wool Co. at La Gro, Ind. In the foreground are the boiler-room building and skip hoist which handles coal and coke. The two cupola stacks are seen rising from the main plant structure. This plant, one of the largest mineral-wool operations in existence, was built last year and was expected to be operating by January, 1938. There is sufficient room for four more cupolas.

BELOW—The new fleet of mixer-trucks of the I. E. Schilling Co., Miami, Fla., ready-mixed-concrete producer, is shown here in a tropical setting. They are lined up in front of the Ford exhibit building on Biscayne Boulevard. The Schilling company, incidentally, supplied the concrete for the structure. The trucks are 1½-ton Fords. Mixer bodies were supplied by the Concrete Transport Mixer Co., St. Louis, Mo.



A pioneer maker of sand-lime brick, the Northern Indiana Brick Co., Mishawaka, Ind., broadened its market late last summer when it installed a Jackson & Church sand-lime-block press. The press, a strip machine, has a capacity of 250 blocks per hr. Units are steam-cured for 8 hr. in huge hardening cylinders and can be shipped immediately. Because of economies in manufacture, the company is able to sell sand-lime blocks at the prevailing price of concrete blocks, which in that area is about 14c.

RIGHT — Ready-mixed-concrete plant of E. Lockett & Son, Pasadena, Cal., which went into operation a few months ago. Designed and fabricated by the Standard Steel Works, Los Angeles, it incorporates a number of original features. Three Chain Belt Rex 3½-cu. yd. MotoMixers on International trucks mix and deliver the material.



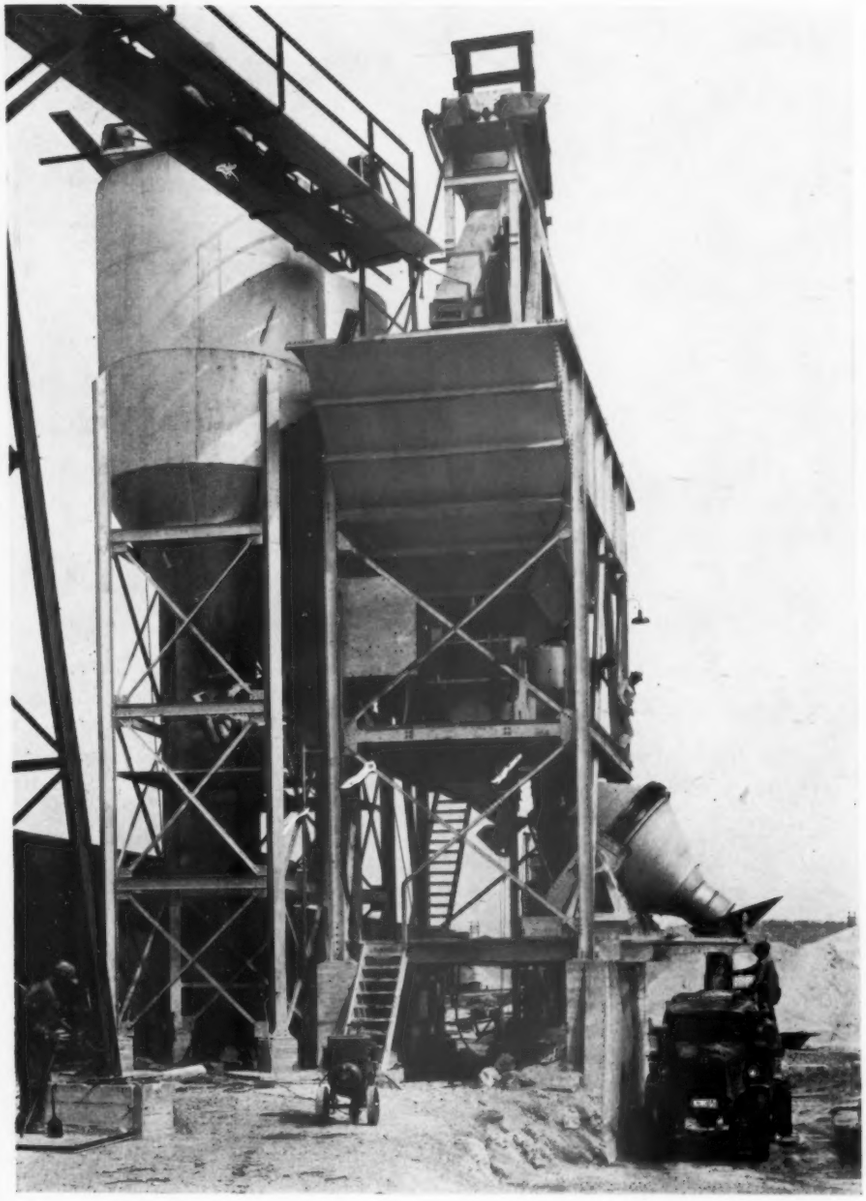
LEFT—In April, 1937 the Southampton Paving Co. of Boston placed this aggregate-bituminizing plant in service on the property of the Concrete Materials Co. at Saugus, Mass. Its capacity is 1,200 tons daily and it was designed and erected by the Warren Bros. Roads Co., which controls the patents on Warrenite Bitulithic paving mix.

BATCHING PLANTS IN TEXAS AND OHIO

The top picture shows the ready-mixed-concrete plant operated by the South Texas Brokerage Co., Corpus Christi, Tex. The batching plant was designed by the Acme Wire & Iron Wks. of San Antonio. Chain Belt Rex 1½-cu. yd. Moto-Mixers on Chevrolet trucks are used to mix and deliver the material. In 1937 five trucks were added to the fleet.

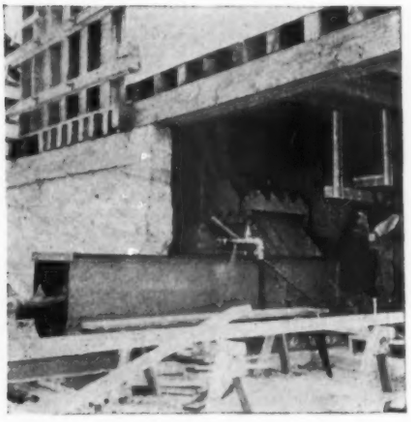
●

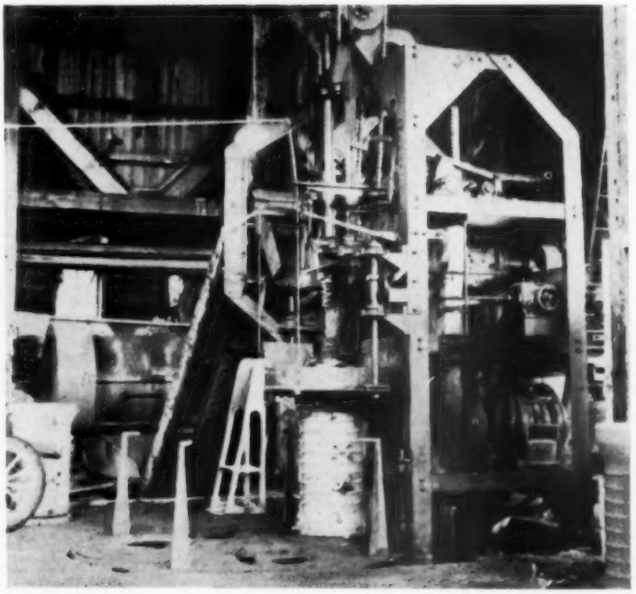
A 55-ft. bucket-elevator raises the aggregate to the new batching plant of the Mixed Concrete Corp., Columbus, O., which went into service in May of last year. This is the second plant to be placed in operation by this concern. Materials are mixed and delivered by a fleet of 11 Jaeger truck-mixers, all of 2½-cu. yd. capacity, the fleet serving both plants. General Motors and White trucks are employed.



Crushed slag is employed as aggregate in the ready-mixed-concrete plant of the Birmingham Slag Co., which adjoins the slag plant and went into service April 1, 1937. Its capacity is 100 cu. yd. per hr. Concrete is plant mixed by a T. L. Smith 2-cu. yd. tilting mixer and deliveries are made by a fleet of mixer trucks, 12 of which are Blaw-Knox machines.

Production of plant-mixed road materials stabilized with calcium chloride was begun by a number of aggregate producers in 1937. Below is illustrated a view at the plant operated by the Ohio Gravel Co. at Newton, O., showing the Brewer pug-mill and clay feeder.

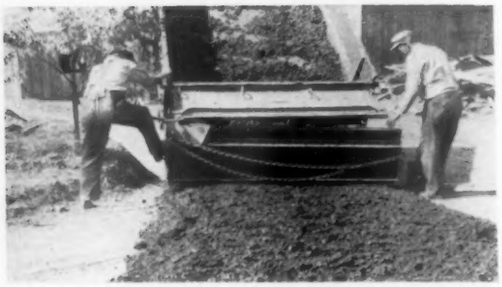




Said to be the first installation to be able to produce 36-in. reinforced-concrete culvert and sewer pipe by the packerhead process, the new plant of the Continental Concrete Pipe Co. started production late in March, 1937 at Blue Island, Ill., a suburb of Chicago. Aggregates are purchased and are received at the plant in self-cleaning hopper cars. At the right is shown the improved Type H pipe-making machine, supplied by the Concrete Pipe Machinery Co., Sioux City, Ia., shortly after production was started. Pipes are steam-cured for about 24 hours after manufacture and are then placed in yard storage. Reinforcing cages are fabricated by welding at the plant.

BELOW—Pug-mill at Roadcrete plant. CENTER—W. A. Stone, county engineer, whose enthusiasm for stabilized roads was an important factor in establishing the plant.

BELOW—Dump truck which hauls the material from plant to job depositing and spreading the calcium-chloride-stabilized mixture on highway in Hamilton County.



A STABILIZING PLANT NEAR CINCINNATI

IN the rapid acceptance of the stabilized-soil method of road construction by highway engineers the nation over a new market of major proportions has been opened for the commercial aggregates producer. When soil-stabilization was first introduced by the U. S. Bureau of Public Roads, the method was strictly a mixing-in-place process, in which the various ingredients—aggregates, clay, calcium chloride and water—were hauled to the road for mixing. Under this method of construction it was difficult to maintain accurate control of the composition of materials, and construction operations were, to a large extent, dependent upon weather conditions. A considerable amount of mixing equipment was required on the road, with resulting annoyance to traffic. Too, there are areas, such as pavement shoulders, narrow alleys, private drives, etc., where mixing-in-place is not even possible. These disadvantages of road-mixing led to the development of plant-mixed, ready-to-spread stabilized material.

Outstanding in this new field is Roadcrete, Inc., of Newtown, O., (a suburb of Cincinnati), which last year erected what is undoubtedly the country's most efficient plant for the production of ready-mixed stabilized road material. The demands of Ohio Valley engineers who, like highway officials in other sections, were quick to recognize the benefits offered by plant-mixed materials, influenced Roadcrete, Inc. to undertake to provide the source for a stabilized mix of highest quality and unvarying uniformity. That the company has met its objective is testified by the score of engineers who seem agreed that "Roadcrete" is a highly satisfactory plant-mixed stabilized material.

W. Allen Stone, county engineer of Hamilton County, O., whose favorable opinion of stabilized road material was a contributing factor in the establishment of the Roadcrete plant, has stated:

"We have every reason to believe that in 'Roadcrete' highway departments are offered a stabilized material ideally adapted for use as surfacing on farm-to-market roads, as base course for hard-surfaced secondary highways, and for berm construction on all types of roads. Its low cost and the ease with which it is placed are among its other advantages that will appeal to road officials."

For experimental purposes the Hamilton County Highway Department last September used 'Roadcrete' in the construction of a stretch of roadway, 2,200 ft. in length and of 20-ft. width. Mr. Stone reports that, upon inspection late in December, the stabilized road was free from rutting and in practically perfect condition, despite the several cycles of freezing and thawing already experienced in Hamilton County this winter.

Conveyor which carries materials to the pug-mill at the Roadcrete plant.

While pre-mixed stabilized materials have been produced with almost every conceivable type of equipment, including the ordinary concrete mixer, Roadcrete, Inc. wanted to protect its customers by making certain that every ton of stabilized mixture would be of uniform composition and quality. Consequently, the company decided to go the whole way and set up the most modern mixing plant it was possible to design. Inspection of stabilized-mix plants in other parts of the country produced a number of ideas, at the same time suggesting possible improvements in methods and equipment. Consultations with highway engineers and equipment manufacturers helped further to present a clear picture of what was needed.

As a result of this investigation and research, coupled with the invaluable assistance of Walter Flach, chief engineer of the Ohio Gravel Co., the Roadcrete plant was designed, constructed and put in operation about the middle of August.

Located adjacent to the plant of the Ohio Gravel Co. on the Norfolk & Western Railroad at Newtown, O., the plant of Roadcrete, Inc. has its source of gravel, sand and clay conveniently at hand. Fortunately the available clay is of excellent quality and well-suited to fill its highly important part in the finished stabilized mixture.

The mixing plant consists essentially of four aggregate bins, three screw-type feeders and a calcium-chloride

hopper, mounted above a belt-conveyor system which discharges the materials into the pug-mill. An Osgood ¾-cu. yd. steam crane is used to deposit the two sizes of gravel, the sand and clay in their respective bins, and a Brewer screw-type conveyor feeds the clay to the belt. Sand and calcium chloride are controlled through screw-type feeders designed by Mr. Flach, and the two sizes of aggregate are fed by gravity.

As the materials are collected on the belt they are conveyed to the Brewer pug-mill and thoroughly mixed with the proper amount of water. The material is then ready for shipment by trucks or railroad cars, loading being accomplished by means of a second ¾-cu. yd. gasoline-driven crane. Surplus material is placed in storage.

The original specifications for "Roadcrete" called for a finished mix containing the following proportions of material: 30 to 35 per cent. of 1-in.

Walter Flach, chief engineer who designed the plant, and Fred W. Cornuelle, president, Ohio Gravel Co.

gravel, 30 to 35 per cent. of ⅜-in. gravel, 15 to 20 per cent. of sand, 10 to 12 per cent. of pulverized clay. These proportions have been subject to some adjustment, however, and it is now believed that a lesser clay content is desirable.

Calcium chloride is mixed with the materials at the rate of 18 lb. per cu. yd. of mixture. This quantity of chemical has been found sufficient to provide the moisture bond necessary to maintain stability of the mixture on the roadway. At the same time the calcium chloride accelerates compaction and reduces the amount of rolling required during construction.

Since opening of the plant in mid-

(*Continued on page 95*)

PROFITABLE NEW PRODUCTS

Running Wild...

Maximum batches per hour, day after day . . . cutting time schedules . . . smashing records . . . more concrete per day than was believed possible. All accomplished with Heltzel modern weighing Batcher Plants.

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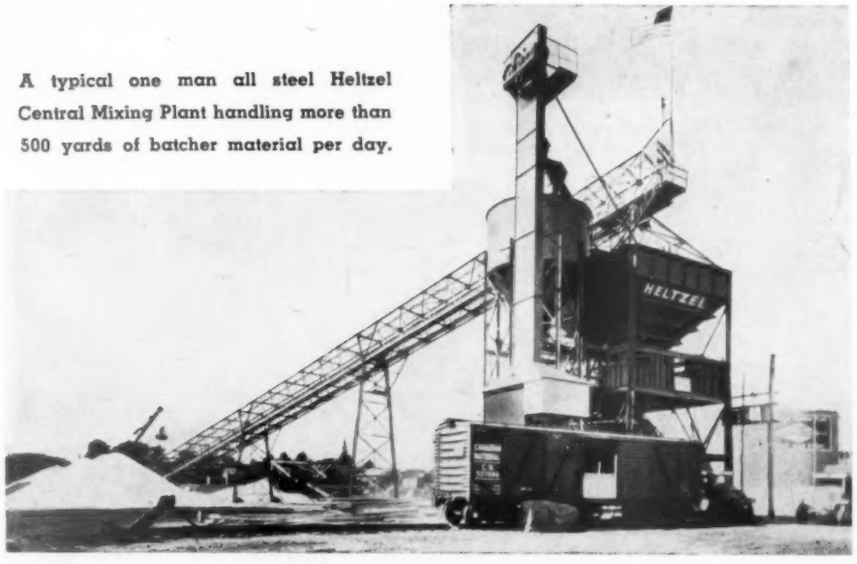
Your copy of Bulletin S-21B filled with typical Heltzel installations is ready. Write today or get one at our display at the Road Show. Sections C-35-36.

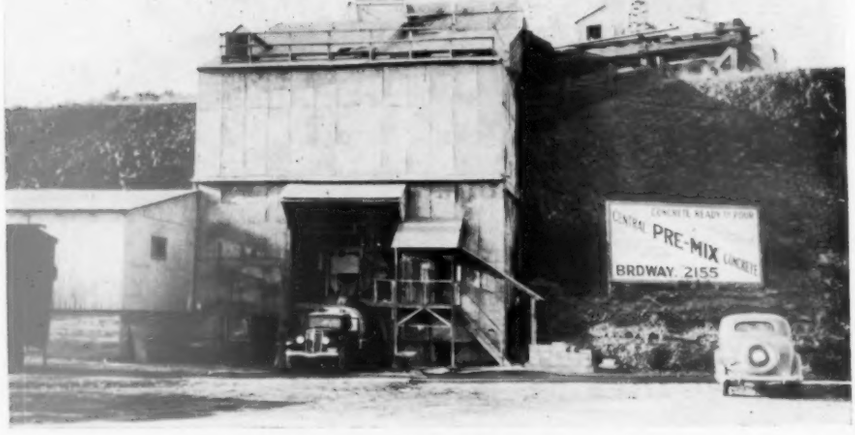
A typical one man all steel Heltzel Central Mixing Plant handling more than 500 yards of batcher material per day.



THE HELTZEL STEEL FORM & IRON CO.
WARREN, OHIO

Ready-Mix Producer Adds Block Plant

Power stripper with mixer above. One man operates the machine while another loads them on the racks.



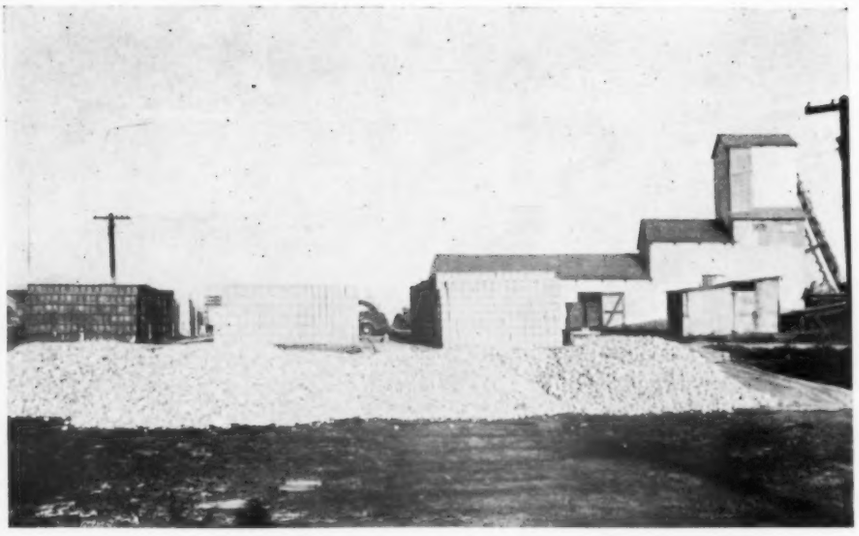
The ready-mix plant with block plant above on hill-top.

THE Central Pre-Mix Concrete Co. of Spokane, Wash., a producer of ready-mixed concrete since 1930, in April, 1937 put into operation a new concrete-block plant. This step was not an unusual one as the preparation and marketing of these two products involve similar problems. The unusual feature in this case was the reason why the company decided to engage in concrete block manufacture. According to H. D. Sullivan, general manager, the building industry in Spokane had staged a slow recovery from the depression, with the result that employees of the company were not always working full time. The building of a block plant had been under consideration for some time, but, according to Mr. Sullivan, what actually decided the company to build this plant was the fact that the truck drivers and other concrete-plant workers could operate this plant during slack periods and earn better average wages. This plan was followed and worked very successfully. Early in the year, however, the demand for both products increased so rapidly that the concrete-plant workers could not be spared from their work and a steady crew was hired to operate the block plant.

This plant is situated on the top of a small hill about ½-mi. from and overlooking downtown Spokane. The concrete plant is at the bottom of this hill at street level. A railroad siding leading to the top of this hill can be used if desired, but at present aggregates for both plants are delivered in trucks. Aggregates for the concrete plant are dumped directly into the plant bins.

Aggregates for the block plant are dumped into a hopper, from which a bucket-elevator distributes them to the three compartments of a 30-cu. yd. storage bin. Torpedo sand, concrete sand and a fine sand are used, and these are blended in the proportions of 3½ : 3½ : 3. These materials are discharged from the bin compartments into an 18-cu. ft. Stearns mortar mixer, which is calibrated inside for the desired proportions. The concrete is discharged from the mixer into an 18-cu. ft. hopper which feeds the Stearns power stripper.

With this machine 28 different sizes of blocks can be made. Blocks can be made in width of 4, 8 and 12 in., in



Block-storage yard with plant in background.

full and half heights, and in several lengths. An average of 6 standard-size blocks can be produced per min.

The blocks are transferred from the machine to racks, which when loaded, are moved on a Barret lift truck to indoor storage. After standing indoors for 12 hr. these racks are moved out of doors on this lift truck and the blocks are transferred to outdoor storage-piles. They are then sprayed for 10 days, and after 18 days further weathering are ready for delivery. Most of the blocks are used for basements and commercial buildings, but several all-block houses have been built and this demand is expected to grow.

A boiler has been installed in a separate building, and the main building is to be enlarged this winter to provide space for steam curing and indoor storage for 2,000 blocks.

The concrete plant has not been changed since it was built. Aggregates are dumped from trucks directly into the five plant bins, which have a combined capacity of 400 tons. The aggregates are discharged into a weighing batcher, where cement is added from sacks. Standard high-early-strength and modified Portland cements are used and are stored in a shed of 4-car capacity. A Chain-Belt 1-cu. yd. drum-type mixer is used to shrink the mixture for 30 seconds before discharging it into mixer trucks.

Originally the complete mixing was done in the plant mixer and the concrete was delivered in three trucks with bathtub bodies. Early in 1936 the company bought five 1½-cu. yd. truck-mixers—four Jaegers and one Chain-Belt. This year two new Chain-Belt truck-mixers were added. By using the plant mixer for shrinking these machines actually mix and deliver from 2 to 2½-cu. yd. per trip. A production of 60 cu. yd. per hr. is easily obtained.

Roadcrete

from page 93)

August the company has supplied "Roadcrete" for stabilized berm construction on 9 mi. of state highway, for 2½ mi. of private roadways in the estate of a Cincinnati insurance-company president, and for several other miscellaneous and demonstration projects. Roadcrete, Inc. plans to make its stabilized-mix available to all points in Ohio, Kentucky and Indiana, and, should the plant's present capacity of 750 tons per day prove insufficient to fill the demand, increased production facilities will be provided. To insure proper construction by competent contractors familiar with local problems Roadcrete, Inc. will only supply the stabilized material and will not engage in actual road construction.

By no means confined only to road and berm construction, plant-mixed stabilized material is the practical means to improvement of lanes and walkways, parking lots, recreation areas, airports, race tracks—in fact, any place where a firm, smooth and dustless surface is advantageous. Its enthusiastic acceptance by architects is forecast by Paul G. Hill of Cincinnati, one of the country's foremost registered architects, who states:

"Ready-to-spread stabilized mixture is, without question, the answer to the problem of residential driveways—long an architect's bugaboo. Its low cost places it within the reach of every house-builder's pocketbook, yet the natural appearance of a stabilized drive is in harmonious accord with even the finest-landscaped estate. It looks to me as though the death knoll has been sounded for the old-fashioned, thoroughly-unsatisfactory loose gravel, stone or cinder drive."

Non-Cumbersome Construction

Illustrated above is a Crescent Bell-End Concrete Pipe Mold. We also manufacture the tongue-and-groove type mold. Available in all sizes, wall thicknesses and laying lengths. Crescent Pipe Molds are made in both Standard Heavy-Duty and Extra Heavy-Duty construction.

An important feature of Crescent concrete-pipe forms is the fact that they are not cumbrous . . . are easy to handle yet extremely durable. Maximum strength and ruggedness are built into them by utilizing steel angles and bars. This lightness and durability assures the maintenance of perfect shape and alignment no matter how long they are used. The market is increasing. Crescent Equipment is inexpensive. With inexperienced labor you can turn out precision-made pipe that will pass all engineering tests and highway-department specifications.

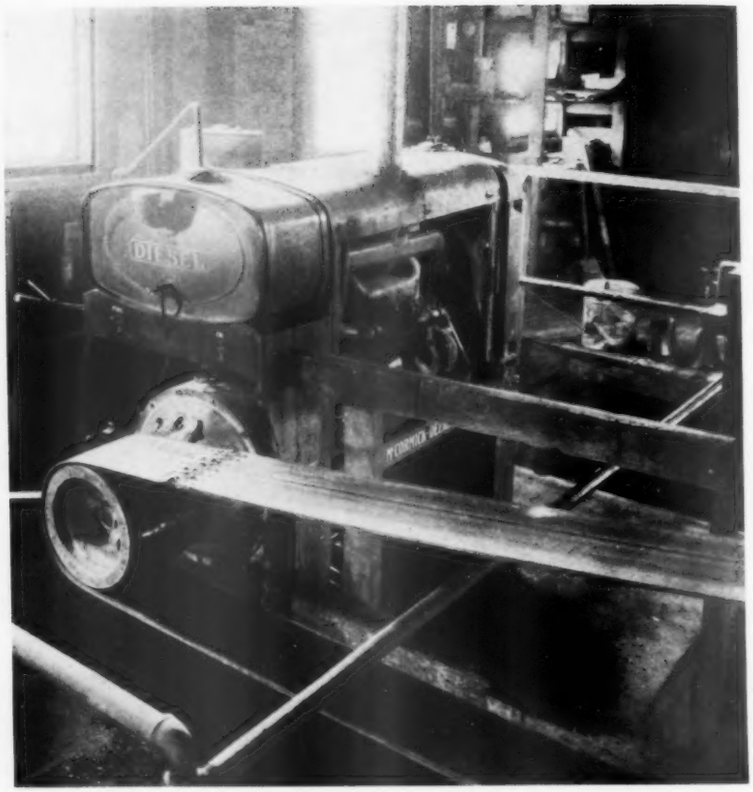
Visit Our Display at the Concrete Industries Exposition at Chicago
February 8, 9, 10, 11
Hotel Sherman

R & L CONCRETE MACHINERY CO.
KENDALLVILLE, IND.

We also are makers of Crescent Concrete Joist Molds and Vibrating Tables

PROFITABLE NEW PRODUCTS

DIESEL LOWERS POWER COST AT PRODUCTS PLANT IN MINNESOTA



The Diesel engine which supplies the Starbuck Concrete Products Co. plant with all its power.

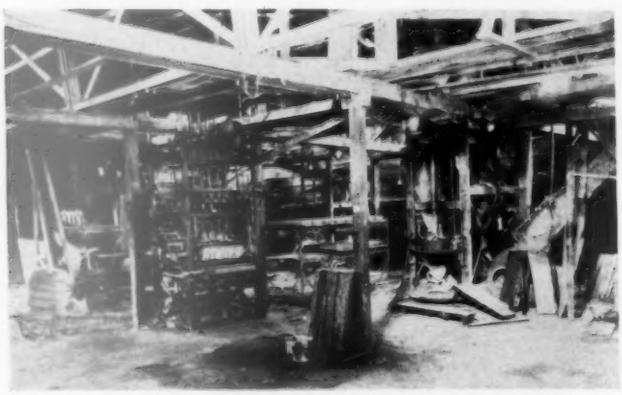
WHEN ownership of the Starbuck (Minn.) Concrete Products Co. changed hands some time ago the new management of this twenty-year-old concern set about increasing efficiency and reducing costs in every department of the business. The plant, employing forty men, manufactures silo staves, blocks, drain tiles from 5 in. to 30 in. in diameter, and highway culverts from 12 in. to 72 in. in diameter. These products are well known and widely used throughout the firm's trade territory in Central Minnesota and run into an annual volume of from $75,000 to $100,000.

From 40 to 50 hp. is required to operate the equipment. All machines are belt-driven from shafting.

Power was formerly supplied by a 40-hp. steam engine on which coal consumption averaged 3 tons a day. Auxiliary belt power was supplied by a gasoline engine which used from $1 to $2 worth of fuel a day. This power cost, in the judgment of the new management, was excessive and it was decided to replace the steam and gasoline engines with something more economical—a Diesel engine.

An International PD-40 Diesel power unit was installed which has since been supplying power for all requirements. Since the day of its installation the Diesel engine has been effecting a saving of from $15 to $18 a day in fuel cost alone. On top of that is a further substantial saving in labor, for whereas the steam boiler and engine required the almost constant attention of an engineer-fireman the Diesel requires little attention, the man in charge being free to do other work most of the time. Repair and replacement expense has been virtually nothing and Henry Nodland, manager, is more than pleased with the engine's record of performance and operation. The plant maintains production during the winter months and Ingvald Larson, plant foreman, declares that there has never been difficulty in starting, even in 35-below-zero weather.

Gravel and sand for the Concrete Products Co.'s operations are supplied by the Starbuck Construction Co., an affiliate concern operating a washing-and-crushing plant at a pit several miles away.



Interior of plant showing stave machine and tile mold.

A view of the gravel plant and pit, showing drag scraper.

By C. D. LOOKER
Research Director, International Salt Co.

Sodium Chloride and Screenings in Stabilized Road Construction*

PRACTICALLY each state in the United States and many foreign countries have built some form of stabilized road in the past five or six years. All are attempting to obtain the same fundamental result, that is, the construction of a low-cost road surface that will remain stable in wet and dry weather, hot or cold, in winter, spring, summer and autumn.

To accomplish this a variety of materials ranging from cement to molasses have been used in road construction as binding agents or stabilizing assistants. Since the work of Dr. C. M. Strahan in Georgia in 1906 on the stabilization of sand roads with clay, and, more especially, since the publication of *Reports on Sub-Grade Soil Studies in 1931* by the Bureau of Public Roads, stabilization of aggregates with soil as binding material with or without the addition of chemicals has been given favorable attention by highway departments. This involves uniform gradation of materials from the coarsest to the finest and often eliminates the use of local materials for road-building purposes. To overcome this difficulty some highway departments are treating the ungraded soil as it is found locally, with cement or asphaltic material. Others are importing the proper materials while some are doing nothing about it.

About four years ago several highway departments became interested in the use of salt (sodium chloride) to be mixed with gravel, stabilized with soil as binding material. Salt was incorporated within the mixture at the time of construction either on the road surface or at a central plant to conserve the moisture in the road surface at the time of construction, to secure better compaction and later to serve as a regulator of moisture beneath the compacted surface. Salt roads have been built in at least twenty states and the mileage is steadily increasing.

Some of the salt roads have been built as wearing surfaces and maintained as such by annually replenishing the salt by surface applications or integrally mixing after a light scarifying for reshaping in the spring. Others have been built as wearing surfaces and later converted to base courses by covering them with bituminous materials. Still others have been designed as base courses and covered immediately or soon after construction with concrete or bituminous surfacing. Some base courses have been treated with salt not only for securing better compaction of the stabilized material but also to lower the freezing point of ground water and eliminate the possibility of frost heaving. Salt has proved eminently satisfactory for all these purposes. From the beginning the amount of clay has been kept low in all salt-stabilized roads. This, undoubtedly, accounts for their good behavior when covered with bitumen and for the almost complete absence of frost heaving.

The reason for greater compaction when sodium chloride is added seems to be due to the fact that road material moistened with a sodium-chloride solution has greater moisture-retentive powers than when moistened with plain water. It seems to be due likewise to increased surface tension and certain electrolytic effects which remove or alter the gel-like films which surround colloidal particles enabling them to unite in closer contact with each other surrounded by thinner and consequently more tenacious solution films.

The value of the greater moisture-retentive power, surface tension and electrolytic effects appears to be apparent throughout the life of the road but seems to be most useful during the construction period when the separate ingredients are reaching equilibrium in the interlocked structure of which the compacted mass is composed. These effects are brought about mainly because the binder portion of the mix is maintained in the plastic condition for a longer time during the period of compaction and setting up.

Compaction of the stabilized mat by traffic continues even after the road has set up and becomes dense on the surface. As drying proceeds, the sodium-chloride solution in the surface deposits very fine crystals forming a thin dense mixture of salt and aggregate which appreciably retards evaporation from the thin films of solution beneath.

When a properly constructed salt-treated stabilized road has "set up" and received its final compaction by traffic or other means, it becomes practically impervious to the free passage of water up or down. A certain amount of water will enter by absorption but not to an extent which will soften the road to a detrimental degree. Excess water can be forced into the mat only by constant contact such as complete coverage or a rise in the water table due to poor drainage. The impervious nature of salt-treated roads adds greatly to maintaining compaction and preserving that hard texture so characteristic of this type of road.

Dry weights up to 152 lb. per cu. ft. have been reported for properly compacted wearing course materials.

Stabilization opens the way for improving the vast mileage of unimproved roads in the United States. In only a part of the various regions where stabilization is economically possible are all the materials available locally. Some of them will have to be imported. Generally, stabilized roads are thought of as low-cost roads of the farm-to-market type or base courses for higher-type surfaces after they have been used during a proving period. For this purpose stabilized roads are replacing the use of traffic-bound macadam roads because compaction is obtained in a much shorter period.

The majority of salt-stabilized roads have been built of soil binder and various kinds of aggregates, including natural gravel, slag, and crushed stone, especially limestone.

In a salt-stabilized road the quality of the material is just as important to insure a satisfactory finished road as it is in any other kind of road. Salt-treated stabilized roads using natural soil binder are giving excellent service. The field for construction of roads in

*Read at Highway Research Board meeting, Washington, D. C., Nov. 30, 1937.

which only natural aggregates and soils are used is somewhat limited. First, the belt of good gravel material is restricted to few localities in the states where gravel is available. Second, the factor of safety in using clay or soil binder as a cementing medium is somewhat limited.

In 1935 the State of Indiana built 20 mi. of salt road at Spencer in which it used crushed limestone, sand and soil. This was and still is one of the very best examples of stabilization in this country. Other roads were built in the same year in the Forest Preserves near Chicago in which local crushed limestone was used to make outstanding salt-treated roads. In other parts of the country, especially in New York, small amounts of limestone dust were added to several salt-treated gravel projects to supply additional filler. We found that these roads were superior to adjoining roads built of identical gravel without the limestone filler. This led us to the possibility of salt-treating roads consisting entirely of limestone screenings with limestone dust acting as the binding material. We knew that salt makes calcium carbonate more available for use by plants because limestone is more soluble in salt solution than it is in plain water. By the same token salt should increase the natural binding qualities of limestone and make a superior road.

In the autumn of 1935 the Maryland State Road Commission used limestone screenings and salt in a road near Ocean City. This road proved eminently satisfactory and, at last reports, was in good condition, although it had not been given much maintenance. During 1936 other limestone roads were made in New York, Illinois, Pennsylvania and Ohio. These jobs, together with those containing limestone screenings as aggregate with soil binder, have been, without doubt, the best stabilized projects.

At the present time we are recommending that highway departments purchase limestone aggregate containing sufficient limestone dust to act as binding material for their stabilized projects. Several roads of this type have already been constructed this year. The Ohio Highway Department is just completing a 2-mi. section near Columbus in which it is using limestone screenings from a local quarry. These screenings were secured from a large stock-pile accumulated from other processes. A screen analysis showed that they came very well within the ordinary specifications for stabilized roads with enough fine material to serve as binder. Rock salt was mixed with the screenings at the pile with the aid of a power shovel. For future construction it is planned to pass the mixture through a pug-mill to secure better uniformity.

We refer to these roads as salt-bound-stabilized limestone roads. We might call them salt-bound-stabilized macadam for there is no reason why other kinds of crushed rock with limestone dust or soil binder could not be used to advantage also. They differ from the old type of macadam or crushed-stone road in that the gradation of material is such that stability is obtained just as soon as the road has become compacted and seasoned. In the old-type macadam road the material was laid down in a heterogeneous unbalanced condition with coarse stones on the bottom and fine ones on top. It was expected that the fine stones would sift down among the coarse stones and produce stability by filling the voids. The completed road generally did not have a well-graded uniform structure and as soon as the surface was disturbed an unstabilized structure presented itself. Traffic then broke the weak bond between the aggregate, and the road did not wear evenly. In a salt-bound-stabilized limestone road the wear is more even because the materials are in equilibrium as soon as the road is constructed.

By the use of uniformly-graded crushed limestone and salt a finished surface, well-compacted and ready for maximum traffic with minimum maintenance, can be secured during the short construction period. This is quite a contrast to the old floating surface composed of traffic-bound screenings ranging in size from 1 in. down to those retained on a No. 10 screen. A 3-in. or 4-in. mat may be constructed in one operation by this method, whereas a traffic-bound screenings road was never finished, for as soon as traffic broke up and compacted a 1-in. layer it was expected to pulverize and compact another one *ad infinitum*. At the same time valuable fines were being lost as dust. In reality traffic and weather were attempting to produce a condition of equilibrium which we produce in one operation by including the fine limestone dust in the well-graded mixture of crushed limestone.

These roads are much harder and tougher than any road built of gravel. The extra cost of purchasing limestone will be more than repaid in greater durability of the road and saving in maintenance costs. The limestone producer who has accumulated large piles of material as refuse from other processes will profit by coöperation with highway departments in the use of this kind of material. This gives him a profitable outlet for accumulated stocks and at the same time provides one of the best materials for low-cost-road construction. For those who do not have stock-piles of stone screenings the crusher may be set to produce a very satisfactory gradation or the proper mixture may be made in two or more separate batches.

Because crushed stone is angular in shape a well-graded mixture furnishes the desirable interlocking of pieces which furnishes greater stability. Because of the rough edges and sides of crushed-stone pieces there is greater internal friction than when smooth aggregate is used. This causes greater resistance to displacement. The natural cementing power of stone dust, especially limestone dust, is enhanced by the use of salt. Limestone is considerably more soluble in salt solutions than in plain water. A 5-per cent. sodium-chloride solution will dissolve twice as much limestone as is soluble in water. When once in solution, limestone will recrystallize during the curing period following construction and after each subsequent period of wetting, thus furnishing added binding power induced by salt. Salt is peculiarly adapted for this use because limestone is less soluble in strong salt solutions than in the 5-per cent. maximum and limestone crystals form as concentration takes place. Furthermore, salt-treated limestone roads stay moist beneath the surface, but dry out sufficiently to allow recrystallization of

The Heltzel Steel Form & Iron Co. has developed a portable batching plant illustrated above which can be used for charging truck mixers or can be used for depositing the material in batch trucks to be delivered to the paver or mixer. The Heltzel company also builds a complete line of portable bulk-cement batching plant equipment, and central mixing and storage bins of all kinds.

Ready-Mixed Firms Ask Exemptions from Pennsylvania's 44-Hour Law

EXCLUSIVE of office help and management, the principal employees of a ready-mixed-concrete manufacturer are hoisting engineers, truck drivers, semi-skilled and common laborers, with truck drivers much in the majority. The latter is not an average truck driver, but one who has, through years of training learned the knack of what proportions are necessary, how much water needs to be added to make the right consistency, and how long a time is to be used in mixing. It takes months of teaching an average truck driver before he becomes an efficient ready-mixed-concrete truck driver. In the two largest cities, Philadelphia and metropolitan Pittsburgh, the majority of common labor, semi-skilled labor, truck drivers, and hoisting engineers employed in manufacturing ready-mixed concrete are members of their respective local craft unions, chapters of the American Federation of Labor.

The manufacturers of this industry are faced with many elements besides perishability of their product; the weather element plays an important part. A rainy day usually spells gloom to the manufacturer. An illustration of this is the case of a manufacturer in the city of McKeesport. Last October he had orders from contractors for delivery of ready-mixed concrete on a certain day that not only would require every one of his seven trucks but the leasing of eleven trucks of other manufacturers. On the day before delivery he prepared to put eighteen mixer trucks to work the first thing in the morning; the break of morning brought rain and with it telephone calls from the three contractors asking that no deliveries be made that day. As a result the manufacturer had to dispense with the services of the trucks for that day; for the leased trucks he was required to pay running time both ways, going from and returning to their headquarters.

The effects of the weather element are more pronounced in the period of November to April. During this period uncertainty always exists as to furnishing the commodity. Production statistics usually show a gradual decline in use from the first of November, reaching the low ebb in January, ascending during February, March, and April, with normalcy in June.

To cope with the weather element, the service-when-wanted element, the uncertainty of time used in delivery, and uncertainty of any deliveries for lack of orders, requires flexibility in the work hours of the employees, especially those directly engaged in the manufacture and delivery of the product. If the weather precludes delivery, then there is loss of time for the employees. If the service-when-wanted requires morning delivery, evening delivery, Sunday or Holiday deliveries, then there may be an early starting hour, a late quitting hour, or work on days ordinarily not recognized as work days. Overtime, by reason of the nature of the business, is as frequent as lost time. Allowing employees to work more hours than those of a normal work day is a practice that has led to a friendly spirit of coöperation between employer and employee. Were it not for the practice of allowing the employees to "make hay while the sun shines," their average yearly pay hours, especially those of truck drivers, would be considerably less than those of the employee engaged in factory work whose hours are not subjected to the weather elements.

Union agreements entered into by ready-mixed manufacturers recognize by their hourly lee-way provisions that there must be flexibility in work hours of the employees. In the truck drivers' and laborers' agreements there are:

No maximum daily hours,
No maximum number of work days,

but a recognition that in Pittsburgh forty-eight hours is a fair week's employment at the regular hourly rate, and in Philadelphia fifty hours. Hours beyond these, during week days, are compensated for on a time and one-half basis. Sunday and holiday hours pay double time.

What effect will Pennsylvania's 44-Hour Law have on the trade practices of the ready-mixed-concrete industry of the commonwealth if variations and exemptions are not granted? The meat of the Act is in Sec. 2 which reads:

"Hours of Work.—Except as hereinafter provided, no employer shall employ any person for more than forty-four (44) hours in any one week, or eight (8) hours in any one day, or on more than five and one-half (5½) days in a period of seven (7) consecutive days."

The effect of this regulation means the casting aside of the trade policy and slogan, "Service-When-Wanted," and the adoption of a policy of, "Service-When-Permitted" for, if eight hours be a maximum day's work and five and one-half days the maximum successive week days of employment of a truck driver, then these after-usual-work-hour deliveries and unusual-day deliveries must cease. The cessation of such deliveries means less ready-mixed concrete, and less ready-mixed concrete means less employment. Further, such cessation of service-when-wanted eliminates overtime for employees, and overtime makes up lost time. Storing up on prosperous days for the lean days that are sure to follow is denied by regulation.

Although the severe hardship of the act is found in Sec. 2—Hours and Days of Employment, the ready-mixed-concrete manufacturer finds an impracticability in Sec. 5 of the act which reads:

"Posting of Schedule of Hours.—(a) Every employer shall post and keep conspicuously posted in or about the premises, wherein any person is

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This article is an abstract of a brief filed by Alexander Foster, Jr., vice-president of the Warner Co., Philadelphia, and R. V. Warren, secretary of the Ready-Mixed Concrete Assn. of Pittsburgh, in which variations and exemptions are sought for the ready-mixed-concrete industry under Pennsylvania's 44-Hour Law. It was presented at a hearing conducted before representatives of the Pennsylvania Department of Labor and Industry on Nov. 16, 1937, at Harrisburg.

employed, a schedule of hours of employment, which shall contain the maximum number of hours each person shall be employed during each day of the week, with the total hours per week, the time of commencing and stopping work, and the time of commencing and stopping the meal periods. If more than one schedule of hours is in operation at a particular place of employment, the posted schedule shall also contain the names of the employees working on the different shifts, and shall clearly indicate the hours required of each person or group of persons, etc. . . . ."

The listing a week in advance of a man for Sunday work, then notifying him on Saturday no work is to be performed on Sunday will mean what kind of a reaction—employee against employer? The listing a week in advance of a truck driver to work on the following Tuesday, and when Tuesday arrives no deliveries are to be made because of lack of orders or inclement weather means what? Is not this likely to break down a coöperative spirit between the worker and employer and to lead in the final analysis to a demand from the employee that he be paid for each day that he was scheduled to work whether he actually works or not? Where union agreements are effective, the laborer and truck drivers are now compensated two hours if they be requested to report and no work be assigned them.

If the ready-mixed-concrete industry is to continue functioning for the benefit of the public in general, the buyer, the manufacturer of the product, and the employees engaged therein, it will be necessary and it is hereby petitioned that the Department of Labor and Industry, with the approval of the Industrial Board, recognize, for the ready-mixed-concrete manufacturers of the Commonwealth, the lee-way provisions of Sec. 2 (b) which reads:

"b. Where the strict application of the schedule of hours provided by this section, imposes an unnecessary hardship and violates the intent and purpose of this Act, the Department of Labor and Industry, with the approval of the industrial board, may make, alter, amend, and repeal general rules and regulations, prescribing variations from said schedule of hours."

Under this authority your petitioners, the ready-mixed-concrete manufacturers, seek the following variations in the schedule of hours:

First: an unlimited day, or if limited, a maximum day of twelve (12) hours.

Secondly: an unlimited week in so far as the number of days of employment, at least during the months of April to November inclusive.

Thirdly: the restriction, if the unlimited day and week as herein requested are granted, of maximum number of hours of an employee to the aggregate hours represented in a year's work of forty-four (44) hours per week for fifty-two (52) weeks.

Your petitioners further pray that the Department of Labor and Industry, with the approval of the Industrial Board, recognize at the same time for the ready-mixed manufacturers, the lee-way provisions of Sec. 5B of the act which reads:

"In any place of employment wherein, owing to the character of the work, it is difficult to fix the hours of employment weekly in advance, the Department of Labor and Industry, on application, accompanied by evidence, which satisfies it of the necessity therefor, may grant a permit dispensing with the schedule (Posting of Schedule of Hours) required in this section."

Under this authority the ready-mixed-concrete manufacturers seek to dispense with the posting of a schedule of daily and weekly hours.

If these requests be granted, then it is believed that the ready-mixed-concrete industry of Pennsylvania can function to meet its trade, present employees will obtain a fair yearly wage, and in all likelihood, by reason of the restricted maximum aggregate yearly hours of employment, new employees will be engaged.

Duty-Free Imports

Complete details with regard to the duty-free shipment into the United States in 1936 of nonmetallic minerals of a value of $43,796,000, and dutiable shipments reaching a valuation of $81,719,000 are contained in Vol. 3 of a series just issued by the United States Tariff Commission entitled *Imports into the United States for Consumption, by Countries, for the Calendar Year 1936.*

Nonmetallic minerals comprise the whole of Group 5 as classified by the commision which contains the following sub-groupings: Coal and related fuels; petroleum and products; stone, lime, cement, gypsum and gypsum products; glass and glass products; clay and clay products; other nonmetallic minerals and manufactures of them; and precious stones and imitations.

Work on the volumes has been completed as a project of the Works Progress Administration at Richmond, Va., employing about 135 persons who previously had completed for the commission a tabulation of comparisons of import statistics for consumption for the years 1931 to 1935 inclusive.

"The demand for these statistics", says the commission in its introduction to Vol. 3, "for work connected with the trade-agreements program has been so great and the requests received for similar information for 1936 have been so numerous that it is thought best to present the statistics for this later year in order that they may be available to the government and the public in advance of their publication in printed form by the Department of Commerce."

Nearly one-half of the cement imports for 1936 which are shown to have amounted to 621,814,326 lb., valued at $1,405,527, came from Belgium. The tariff rate on this item was changed from 60/1000c. to 45/1000c. per lb. by the Belgo-Luxemburg Reciprocal Trade Agreement, effective June 15, 1936. Another statement shows that 96,649,946 lb., valued at $190,954, came in from Germany at the old rate because Germany ceased to enjoy most-favored-nation treatment on October 15, 1935.

Imports of crude gypsum, the bulk of which came from Canada, duty free, are shown to have amounted to 590,710 tons, valued $620,943.

The plant and quarry of St. Mary's Cement Co., Ltd., at St. Mary's, Ont., Canada. A new quarry was recently opened close by to supply stone and the plant's storage capacity for finished cement has just been enlarged to 300,000 bbl. by the erection of 11 new silos, not visible in the picture. F. L. Smidth & Co., New York, N. Y., were the engineers in charge.

An example of beauty, permanence and low cost by the use of concrete brick. Over 80 per cent. of all wall material is aggregate.

Color Broadens Concrete-Unit Market

COLOR has always been the dominating factor in human life. It influences values. It gives each man's possessions an individual distinction. Color was always the final dress for man's achievement whether it was his first crude effort of weaving cloth for his clothing or the construction of his shelter. It has always expressed each individual's taste. It was his means of competing with nature in the creation of his ideals of beauty.

The average man's biggest single financial investment and accomplishment is the building of his house, and so here more than anywhere else he wants to express his individuality by the use of color. Up to recent years choice of color in permanent building material was severely limited and the cost of these materials was beyond the means of the big mass of house builders. So with these limitations the big majority had to content themselves with the use of short-lived materials and be penalized with a costly periodic dressing of color in some form such as paint.

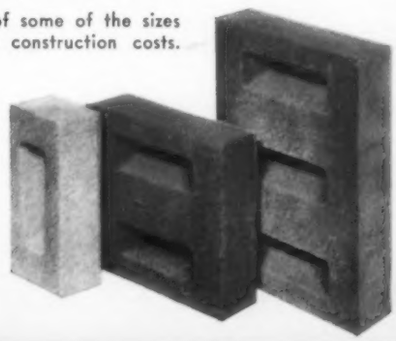
In this desire of ownership of a permanent structure at a cost consistent with the average man's income lies a vast potential market for the aggregates and cement industries. No other material can so well meet these requirements as concrete in the form of building units.

Equipment is available in small, efficient units designed to serve a local trading area enabling utilization of these local materials, affecting the utmost in economy by direct factory-to-job delivery. The modern production equipment has brought concrete building materials to a state of perfection in quality far beyond that of any known requirement.

Cost reductions are further reflected at every step from the actual manufacture of the product to the finished job. Continuous line production methods of these products has brought labor cost down to as little as $1.25 per 1,000 bricks reported by some operating plants. New ingenious designs of units have reduced their weight and consequently the volume of materials used in their manufacture.

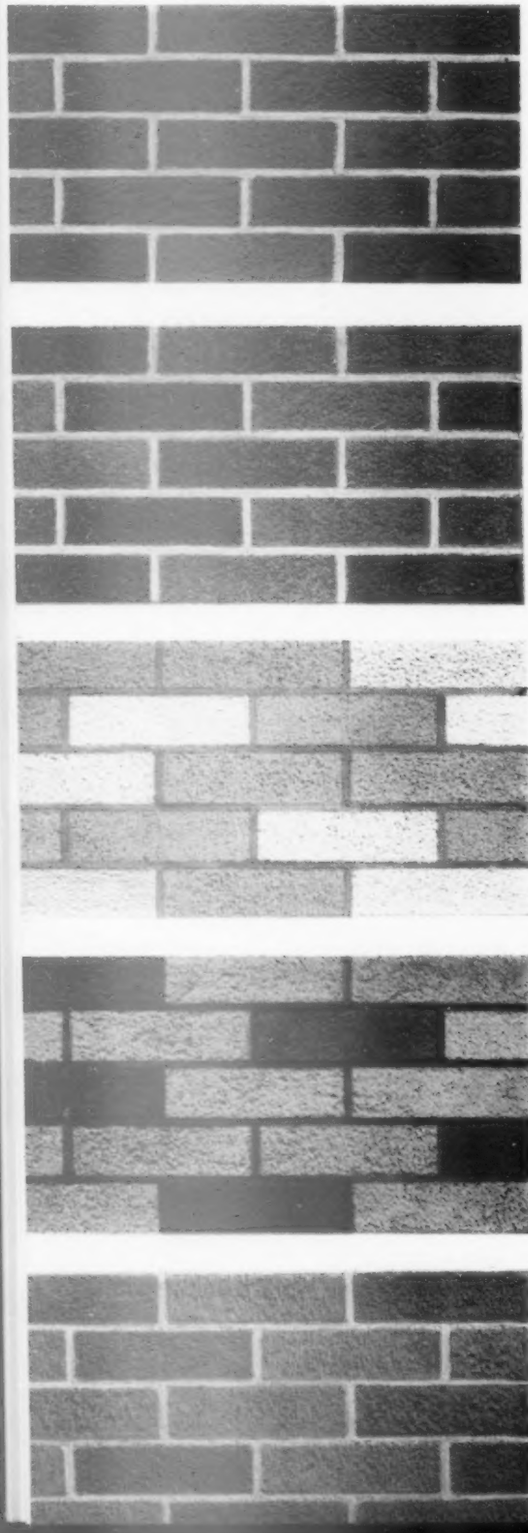
And now the lack of color, the last obstacle to the domination of the permanent building-material market, has been overcome by inventive genius and patient research. Color in the most complete range of shades and textures that has ever been known in the building industry can now be had in concrete units, making them by far the most desirable and biggest value in the building-material field.

Examples of some of the sizes that lower construction costs.



PROFITABLE PRODUCTS

Like concrete itself, this new coloring material and process is extremely flexible. It can be applied to individual units giving them a rich, colorful, waterproof face; or it can be applied over a completed structure, giving it a monolithic, protective colorful coating. The material, being basically a cement-and-sand mixture combined with pure mineral pigments, has all the durability of concrete. The special process of application further assures its permanence as it produces an extremely dense, lustrous surface that defies the elements.



For many years the aggregates industry made but slow progress in entering the residential construction market. The gradual development in house equipment, such as the heating plant, brought about the first universal use of concrete in foundation and basement floors. But progress became almost dormant and the industry secured only a very small proportion of the annual construction volume.

To-day the manufacture of concrete bricks and their many multiple sizes in an almost endless variety of color and textures, coupled with the combination of present-day conditions and improvements, have broadened this opportunity tremendously, and have opened the way for the aggregates and cement industries to dominate this gigantic market. Added to this is the fact that the building public has become extremely conscious of the terrific penalty paid annually in maintenance, depreciation and obsolescence of short-lived materials. Long-term financing, too, naturally favors construction using permanent, lower-cost units.

Only a few years ago the use of concrete brick as a building material was practically unknown. To-day it has been used in almost every type of building, as well as United States Government and state projects. Architects have specified it both for face-brick exteriors and for back-up material.

Concrete bricks usually consist of from 80 to 90 per cent. aggregates and in many cases surplus or partially waste material is used. The aggregate—sand and gravel or crushed stone—is available in almost every community, and by adding a small amount of cement to the aggregate and passing it through an inexpensive manufacturing plant the finished product results.

Here is a vast market within the reach of practically every producing plant, for equipment manufacturers, too, have made great strides in the development of efficient machinery for converting aggregates and cement into better building materials. There are in the market to-day low-cost plants designed to operate with small crews, yet capable of producing a sufficient volume to serve the market of the trading area surrounding the average city. These plants are so designed that on one production machine it is possible to manufacture not only standard bricks, but multiples of this unit up to 25 in. in length, as well as floor slabs and joists, thus giving the manufacturer the greatest possible volume and enabling him to meet every building need from basement to roof.

There have also been most important advancements in the design of the units produced. Their weight has been reduced and the many multiple sizes makes it possible to produce improved structural design at large savings.

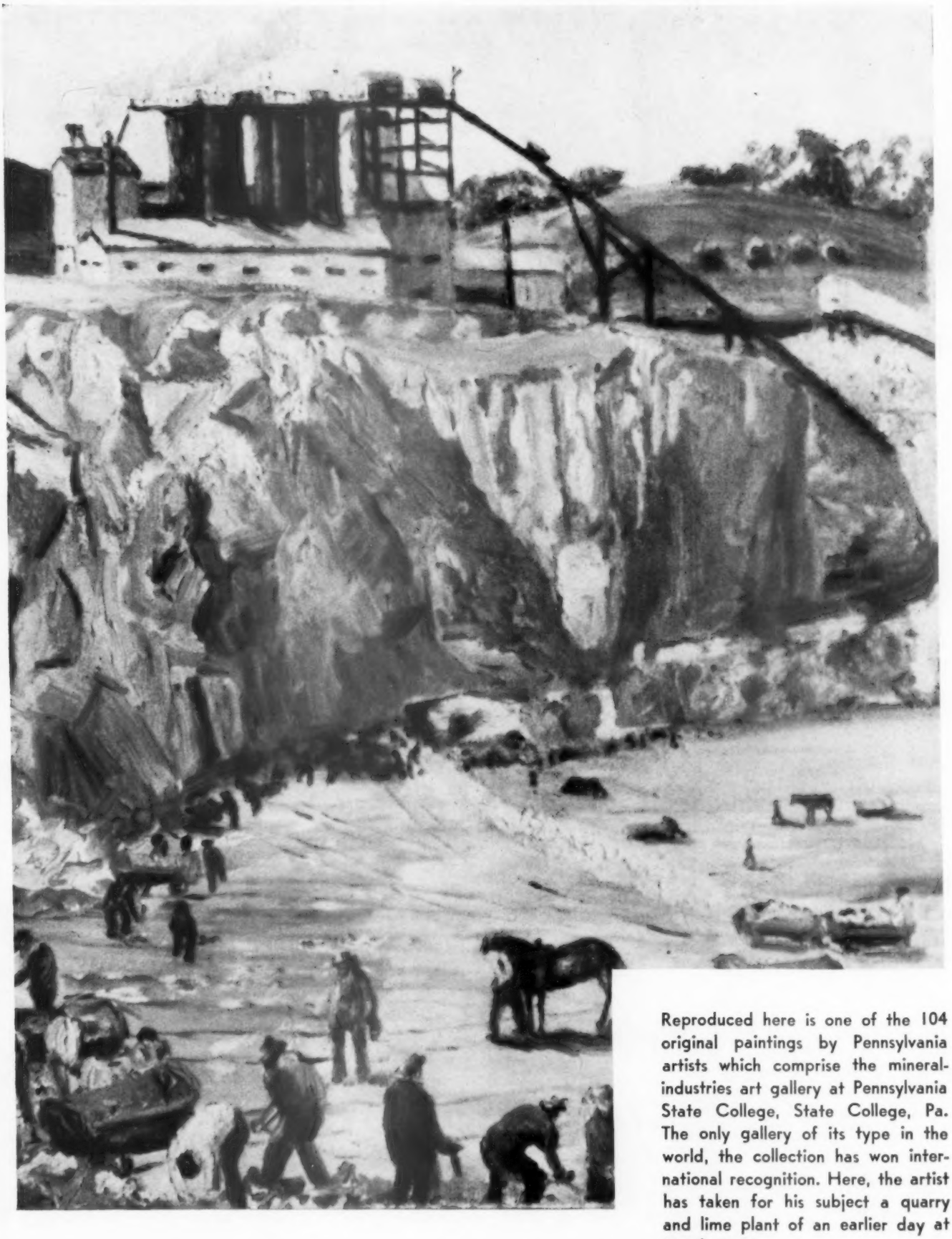
And now comes color, the final and probably the most essential development for pushing concrete into the foremost position as the outstanding building material. To-day it is possible, practical and simple to produce these units in the greatest range of color, shades and textures that can be offered to the building field.

The importance of this final step in the perfection of concrete building materials and the meritability of public acceptance of these materials can be easily visualized by looking about us. To our clothing, furniture, automobiles, household furnishings—in fact to everything—color lends added attractiveness, variety and charm. Based upon its powerful appeal, color has an intrinsic value that can be measured in dollars and cents.

As formerly this lack of color limited the market, so to-day this new conquest of scientific research in developing materials, processes and equipment broadens the acceptance of these new units in every type of construction. In commercial buildings they offer the most suitable material for carrying out identifying color schemes that are universally used by many of America's largest building institutions. In residential construction they now best serve the market, as with this latest development personal tastes and color-harmony demands can be met at prices within the reach of the great mass of house buyers in the lower price brackets.

So at practically every producer's doorstep lies the opportunity to increase his volume by preparing to supply this ready market. Every advantage lies in his hands. He has the aggregate. His location is usually ideal. His market is all around him. His building products can be delivered from the plant direct to the job without the usual heavy transportation cost attached to competitive building materials. Thus, one can easily foresee the domination of the brick business by aggregates and cement producers. Again the financial investment neccessary to serve this growing market is usually but a fraction of what he has already invested in his present plant, and yet the opportunity for profit is far greater per cubic yard of concrete when converted into permanent, perfected multiple building units which he can now offer to the building trade.

LEFT—Examples of some of the shades and textures possible in modern concrete brick.



Reproduced here is one of the 104 original paintings by Pennsylvania artists which comprise the mineral-industries art gallery at Pennsylvania State College, State College, Pa. The only gallery of its type in the world, the collection has won international recognition. Here, the artist has taken for his subject a quarry and lime plant of an earlier day at Hershey, Pa.

HERSHEY STONE QUARRY, BY SAVERIO DI MAGNO

STABILIZING WITH EMULSIFIED ASPHALT

Lakeside Drive in Oakland, Cal., which skirts famous Lake Merritt. This is said to be one of the most heavily-traveled streets in existence and has a stabilized-slurry base.

By W. E. TRAUFFER

THE subject of soil stabilization with emulsified asphalt is one in which many aggregate producers are interested as it gives them an outlet for quarry and pit waste materials which are otherwise a dead loss. A paper, *Stabilizing Quarry Fines for Base Construction,* prepared by C. L. McKesson, director of engineering and research, American Bitumuls Corp., was presented at the 1936 Annual Convention of the National Crushed Stone Association in Cincinnati. This paper, which created great interest among producers present, explained in detail the advantages of this type of road base, the material suitable for use in its production, and gave much other useful information.

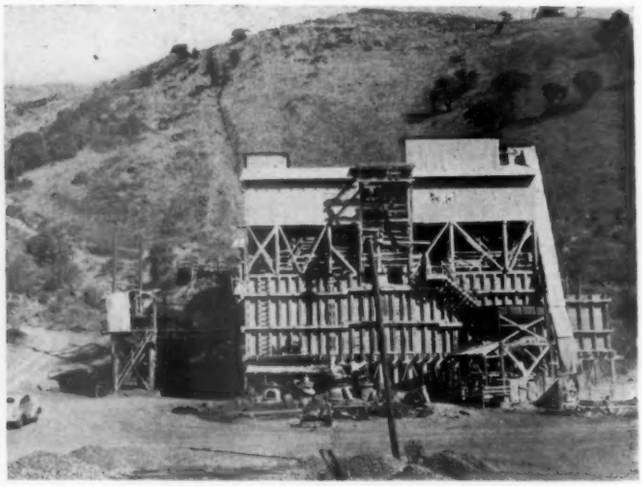
The writer recently made an extensive trip through the western and Pacific Coast states on which he had an opportunity to study the production and utilization of this type of material in those states. No attempt will be made in this article to discuss the advantages of this product or to describe in detail the methods of application as such information can readily be obtained from emulsion manufacturers.

On the west coast, as elsewhere, this new type of road base first had to sell itself but is now almost universally accepted. It is being extensively used by the city of Oakland and many other municipalities and was used recently in new airports in Oakland, Sacrament and San Francisco in California. The runways at Hamilton Field are made of this material and it is also being used on a service road to Fort Barry which guards the Golden Gate from the north.

Other uses which have been developed for this material may eventually become important markets. In the San Francisco area a number of producers are now making blocks and bricks from stabilized materials. Most of these are being made in hand molds but at least two producers are making them in machines. The Stockton Brick Co. at Stockton and the Valley Concrete Pipe Co., Yuba City, are making them in machines. These bricks are not affected by water erosion.

According to the best information available, the fact that waste materials

The plant recently completed by the Henry J. Kaiser Co. at Radum, Cal., for the production of stabilized-slurry base.



The crushed stone plant of the Heafey-Moore Co. at Oakland, Cal. At left is the slurry-base plant.

could be stabilized was accidentally discovered. An old asphalt roadbed was being dug up when it was found that due to the lateness of the season no suitable aggregates could be secured. It was decided then to make a road mixture of the aggregates and soil dug up and to roll these back in place for the winter. In the spring it was found that the road had stood up very well under heavy traffic and that nothing more needed to be done except to apply a surface coat. The bitumen had reacted with the soil and aggregates and their contained moisture to form a stabilized-slurry road base. The present technique was developed from this accidental discovery and suitable emulsions are now being made by a number of companies.

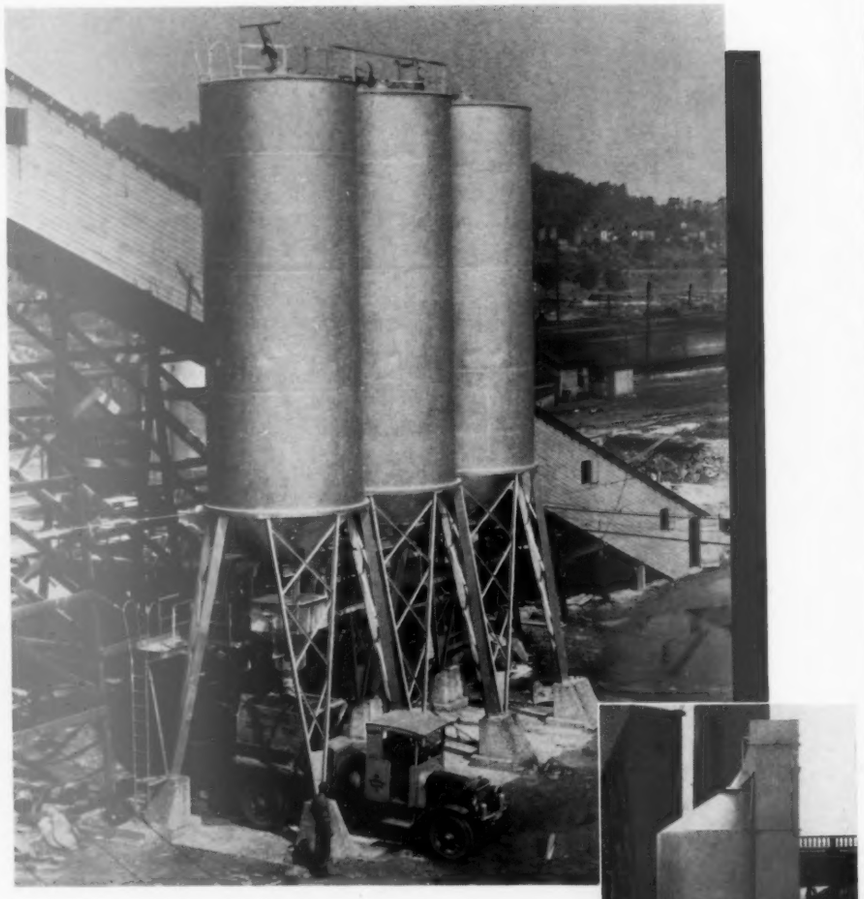
The emulsion used in stabilized-slurry road bases is one of the best mixing types with the highest mixing properties. Because of the nature of the materials to be mixed with it, this emulsion must combine readily in the mixing process. It is made by adding a stabilizing agent to a high-grade penetration emulsion of the type used in road-surface mixtures. In this emulsion the particles of asphalt are colloidal in form and are sufficiently stabilized against breakdown or coagulation to resist coalescence, even while being mixed with soil or cement. In practice enough water is added to the materials to separate and lubricate all the particles. In mixing with the emulsion the minute globules of asphalt intermingle with the soil, clay or dust particles. As the mixture dries the water films around these particles become thinner and develop a surface tension which pulls the asphalt globules into thin films around the particles. When drying is complete, these films are brought by absorption into intimate contact with the surface of the soil particles. The finished dried product will not absorb water and swell and retains a high degree of stability under severe water and frost conditions.

One of the first to produce Bitumuls stabilized-slurry base material from quarry wastes on the Pacific Coast was the Heafey-Moore Co. of Oakland, Cal., contractor and producer of crushed stone and bituminized aggregates. Others in the San Francisco area producing this material are the Hutchinson Co., Oakland, and the Granite Rock Co., Watsonville, crushed-stone producers, and A. Teichert & Son, Inc., Sacramento. Facilities for the production of this material have recently been installed in the Radum, Cal., plant of the Henry J. Kaiser Co., now

The hot- and cold-mix aggregate-bituminizing plant of the Heafey-Moore Co. at its Oakland material yard.

The plant of the Perkins Gravel Co. at Sacramento, Cal. with stabilized-slurry-base plant of A. Teichert & Son, Inc. at left.

Laying top surface over an existing asphalt pavement in Oakland. This material was supplied by the Heafey-Moore Co.



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The Heafey-Moore Co. is producing this material at its quarry in Oakland. The quarry waste is fed by a belt-conveyor into a pug-mill mixer, where the desired amount of Bitumuls is added. Trucks are loaded from the mixer. According to M. J. Moore, vice-president of this company, this quarry waste forms about 20 per cent. of the company's total production and over a period of years had accumulated in a huge waste-pile. In recent years 40 per cent. of this material has been used in the production of stabilized-slurry base material.

Mr. Moore says this base material can be mixed hot or cold in any asphalt plant, but his company has found that cold mixing in a pug-mill gives the best results. A plant for the production of this material can be built at low cost and can easily be moved. As a contractor Mr. Moore uses this type of base material wherever possible because of its imperviousness to water and the fact that it is easier to lay and less expensive than other types. Where necessary he has had no difficulty in getting specifications altered to permit the use of this material. This company also operates a mixing plant at its Oakland yard for the production of other hot or cold bituminous mixtures.

The Henry J. Kaiser Co. recently installed equipment for the production of Bitumuls slurry base at its Radum, Cal., sand-and-gravel plant. Heating tanks and a drier are on hand and will be installed later so hot-mixed material can also be produced.

Pit-run material and overburden used in the production of this stabilized slurry base are loaded into cars and dumped into a re-run hopper at the plant. A feeder discharges these materials on a 36-in. belt-conveyor which takes them to one of two 25-cu. yd. steel bin compartments. The other compartment will be used for other materials. The pit-run material is weighed in a 3,000-lb. Bodinson batcher with beam scales. The Bitumuls is separately weighed in a batcher equipped with a dial scale. Water is added to these ingredients in the 4,000-lb. Bodinson pug-mill. The product of this mixer is discharged into railroad cars for shipment. The gates on the hoppers, batchers and mixers are operated by Galland & Henning 4-way air valves. If necessary, these materials can first be passed over a vibrating screen and then recombined to insure the correct percentage of fines and materials with binding properties.

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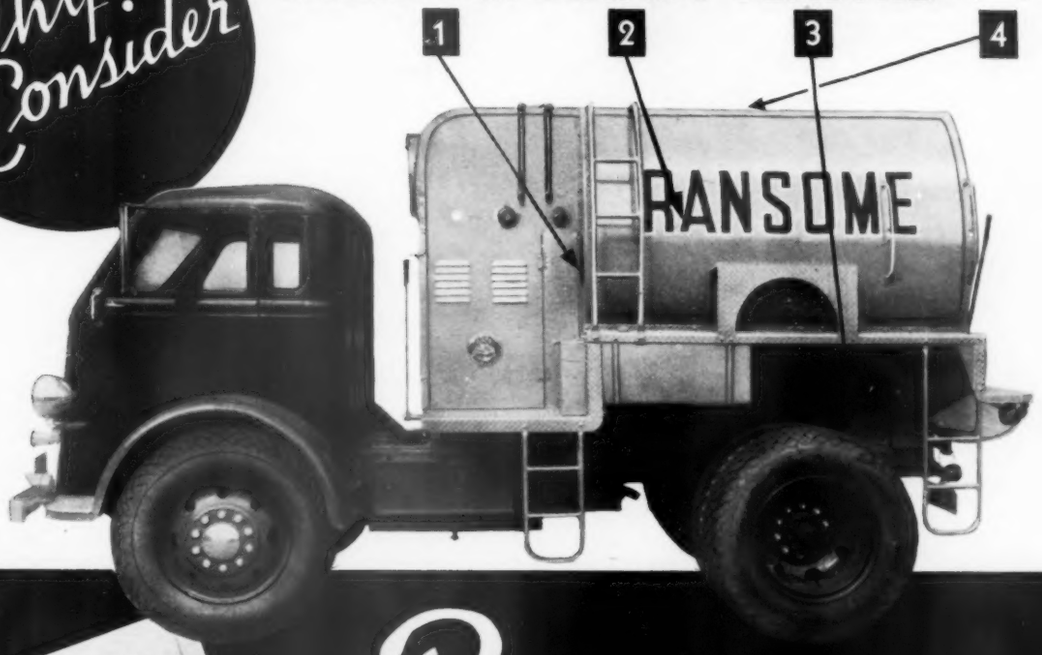

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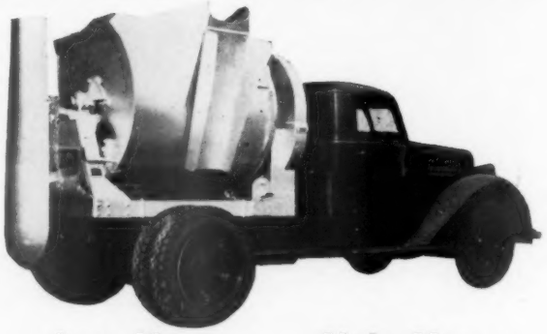

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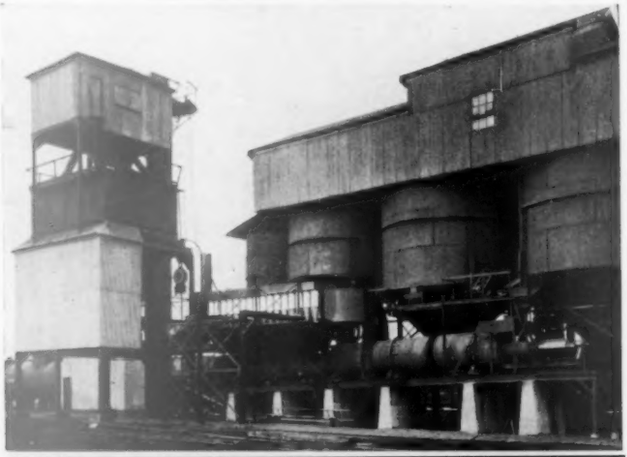

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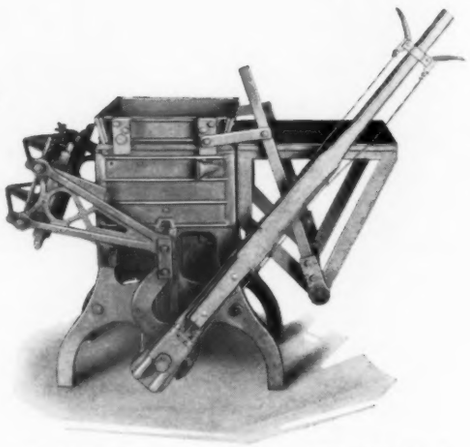

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☐ Pulverizers, Roll
☐ Pumps, Centrifugal
☐ Pumps, Deep Well
☐ Pumps, Sand and Gravel
☐ Pumps, Slurry
☐ Pumps, Steam
☐ Radiators, Engine Cooling
☐ Rails
☐ Refractories
☐ Respirators
☐ Rollers, Conveyor
☐ Rolls, Crushing
☐ Rope, Wire
☐ Safety Appliances
☐ Sand-Lime-Brick Machinery
☐ Scales, Track
☐ Scales, Truck
☐ Scrapers, Dragline
☐ Screens, Revolving
☐ Screens, Shaking
☐ Screens, Vibrating
☐ Separators, Air
☐ Separators, Dry Centrifugal
☐ Separators Magnetic
☐ Shovels, Gasoline
☐ Shovels, Steam
☐ Skips
☐ Sleeves, Dredge
☐ Slugs and Nuggets, Grinding
☐ Speed Reducers and Gears
☐ Spray Nozzles
☐ Sprays, Paint
☐ Sprockets
☐ Steel, Tool
☐ Stokers
☐ Switches, Track
☐ Tanks, Concrete and Stee
☐ Tanks, Sand Settling
☐ Tanks, Wood
☐ Thickeners, Slurry
☐ Track, Portable
☐ Track Shifters
☐ Tractors, Crawler
☐ Tramways, Aerial
☐ Trippers, Belt
☐ Trippers, Tramway
☐ Unloaders
☐ Valves, Pump
☐ Washers and Scrubbers, Sand, Gravel, Stone
☐ Weighers, Automatic
☐ Welding Supplies
☐ Wheels, Car
☐ Winches
☐ Wire Cloth
☐ Wire Cloth, Manganese Steel

To be used for.....

Firm Name.....*Individual*.....

Address.....*City*.....*State*.....

WASTE MATERIAL — LOWER COST BRICK — REDUCED BUILDING COST — SAVINGS AT EVERY STEP — OFFER SOUND BASIS FOR PROFITABLE MANUFACTURING

IN WASTE OR SURPLUS MATERIAL, aggregate producers are just beginning to realize that they have a real source of profit right at their very door. Already many of them are installing equipment for the processing of what was formerly a liability into a real asset. Among these aggressive producers is the CONSOLIDATED QUARRIES CORPORATION of Atlanta, Georgia, whose plant is illustrated above. Month after month this Company is converting hundreds of tons of their waste material into the most modern of all building materials.

LOWEST MANUFACTURING COSTS—By simply feeding this aggregate and cement into a DUNBRIK-DUNSTONE Line-Production Machine, a steady stream of finished units are produced. With such a plant and two men, you are set to make perfect brick at lowest cost. Your equipment costs but a fraction of other equipment of equal capacity; and with factory-to-job delivery you can dominate the brick business in your vicinity.

REDUCED BUILDING COSTS—DUNBRIK with its recessed design, not only requires 20% less material, but is 20% lighter in weight. This cuts handling, transportation, and cost of laying in the wall. Its accuracy, high crushing strength, and low absorption are just a few of the superiorities of DUNBRIK as the finest of all masonry materials.

FACE BRICK AND DUNSTONE are produced in the one plant, thus enabling you to supply a full range of more than forty colors, shades and textures. This, with multiple size units displacing from two to nine brick (including mortar), further reduces building costs, making it possible to erect beautiful, permanent, firesafe buildings at cost level of frame.

SOUND BASIS FOR SUCCESS—In the DUNBRIK-DUNSTONE Plant you will have a combination offering an outstanding manufacturing opportunity for big earnings. You have the aggregate. You have a waiting and growing market all around you searching for better building materials at lower cost. INVESTIGATE. Learn how easily you can cash in on your waste or surplus material, and supply this market with a better, more attractive, lower cost building material, with a two-way profit for yourself. SEND FOR BOOK "4 KEYS". It tells the complete story. Write today.

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420 W. 24th St. HOLLAND, MICHIGAN

Order one of the first copies off the press

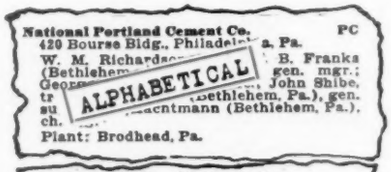
The 1938 Directory section of Pit and Quarry HANDBOOK is the most complete ever published. It is up to the minute—as modern as skill and money can make it. It's checked and double checked. Ready about Feb. 1st.

It gives you the names of the companies, their officers, the number and locations of plants, their capacities and equipment, and the names of the men who buy.

The technical section gives the latest production methods and practices. And there are consolidated catalogs of equipment.

It's Alphabetical

By Company Names →



It's Geographical

By Plant Locations →

BRODHEAD Northampton
(P. O. Bethlehem.)
National Portland Cement Co. PC
Branch of Philadelphia, Pa.
Plant Executives: H vendel, supt.;
A. P. Hachtmann Franks, v.-
pres., gen. ipment.
Pro apacity: Portland
cei
Na Deposit: Limestone. Stripping: Shovel. Drilling and Blasting: Blast hole drills. Digging and Loading: 2 P. & H. 2-cu. yd. electric shovels. Delivery to
GEOGRAPHICAL

Hundreds of New Listings . . . Others Checked for Accuracy

The 31st edition of the Handbook out soon will be of greatest benefit to those who order promptly and receive their copy immediately. Use coupon below. Select either the complete Handbook *and* Directory, or the convenient Directory alone in smaller, flexible binding, more convenient for salesmen. The price is the same in either case.

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Pit and Quarry,
538 S. Clark St., Chicago, Ill. Date.....

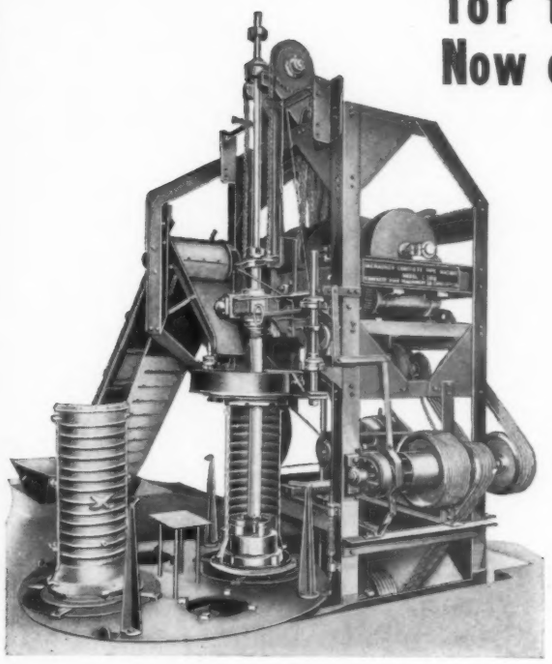
Please send.....copies of the 1938 HANDBOOK ($10.00 per copy) ☐ Check enclosed .....
Please send.....copies of the 1938 DIRECTORY ($10.00 per copy) ☐ Send Invoice with book

Name ..... Title .....

Company .....

Town ..... State .....

THE DUAL PACKER HEAD RECOGNIZED FOR YEARS AS THE ECONOMICAL CONCRETE PIPE MACHINE



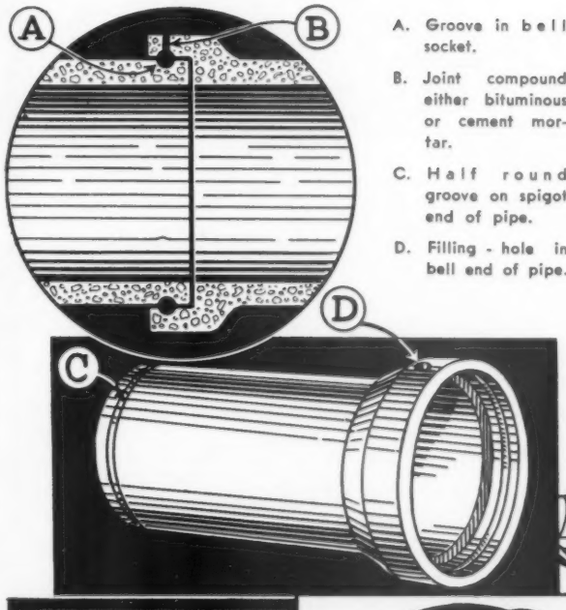
for the making of small pipe . . . Now offers the same economy in sizes up to 36 inches.

What the Dual Packer Head System has meant to small (4" to 24") pipe, the New Roller Head now means to intermediate (24" to 36") sizes. It has added 50 per cent in strength, the same comparative speed of production, the elimination of pallets, which now spells ECONOMY all the way from 4 to 36 inch on ONE MACHINE. Also substitutes one elliptical for two lines of reinforcing saving 20 to 30 cents a foot. Another EXCLUSIVE FEATURE.

New Sealtite Joint*

A New Patented Joint which will prove very desirable to City Engineers, because it eliminates leaky joints. Faulty joints cause cesspool contamination of the ditch line and excessive infiltration, whch greatly overburden expensive Disposal Plants. This Dual Packer Head machine enjoys exclusive rights to make the Sealtite Joint on bell and spigot pipe and is one of two machines that can use it on tongue and groove pipe.

*The Sealtite Joint available to Hand Cast manufacturers. Write Kansas City Concrete Pipe Co., North Kansas City, Mo.

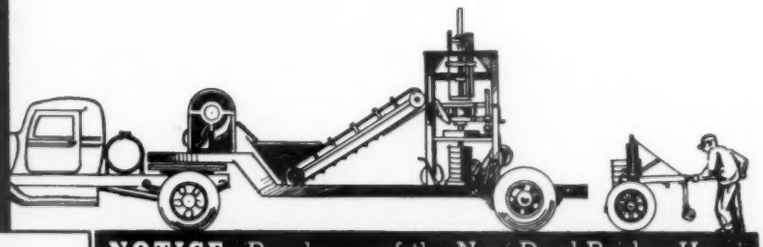


A. Groove in bell socket.

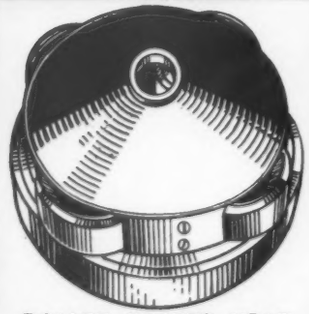
B. Joint compound either bituminous or cement mortar.

C. Half round groove on spigot end of pipe.

D. Filling - hole in bell end of pipe.



Packs a 4" wall to the same density that Packer Head packs a 1½" wall. Does not twist or tend to rotate the cage.



ROLLER PACKER HEAD

NOTICE: Purchaser of the New Dual Packer Head machine also buys the right to lease a Portable Machine which makes possible the handling of jobs beyond the reach of one's permanent location. This leasing policy eliminates the transportation problem and helps sell the pipe because it is made with local labor and local materials. This leasing right is limited to customers of

CONCRETE PIPE MACHINERY CO.
SIOUX CITY IOWA U.S.A.

The Latest in Methods, Materials and Equipment Awaits You---at the

CONCRETE INDUSTRIES EXPOSITION

SPONSORED BY

NATIONAL CONCRETE MASONRY ASSOCIATION

AMERICAN CONCRETE CONTRACTORS ASSOCIATION

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FOUR BIG EVENTS

1. **The National Concrete Masonry Association Convention.**
2. **The American Concrete Contractors Assoc. Convention.**
3. **Cast Stone Institute Convention.**
4. **Concrete Industries Exposition.**

February 8, 9, 10, 11, 1938

at the

SHERMAN HOTEL

Chicago, Illinois

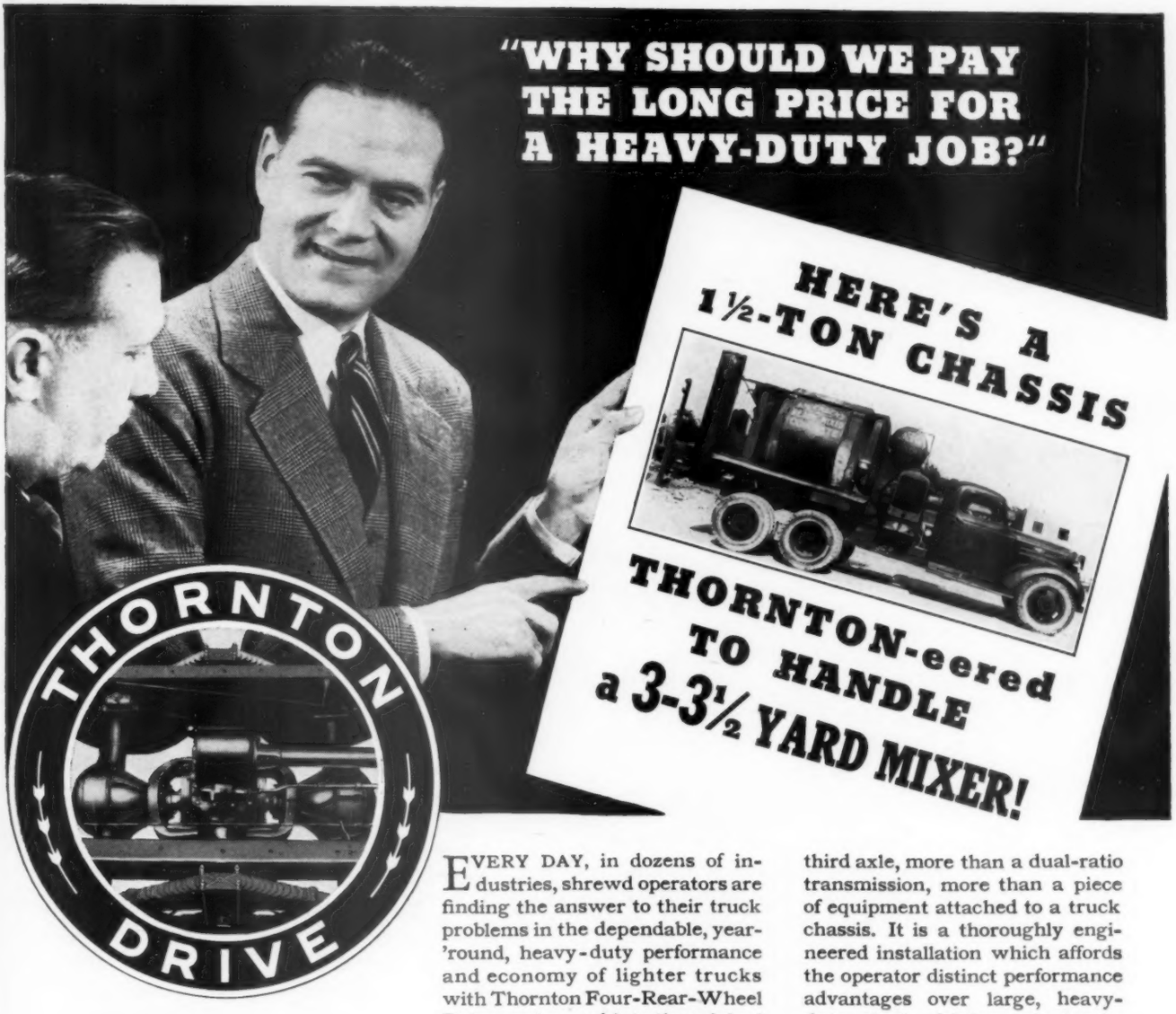
Here you will see the greatest display of concrete machinery, equipment and materials ever assembled. Every well known product of the concrete industry will be on display.

Don't miss this golden educational opportunity to meet with the nationally known leaders of the industry. Come and learn about new, improved methods that will give you new ideas that you can apply to your own business in 1938.

★

Plan NOW to attend these conventions to take place simultaneously with the

Concrete Industries Exposition


"WHY SHOULD WE PAY THE LONG PRICE FOR A HEAVY-DUTY JOB?"
HERE'S A 1½-TON CHASSIS
THORNTON-eered TO HANDLE a 3-3½ YARD MIXER!
THORNTON
DRIVE

THORNTON STANDARD UNIT recommended for loads up to 26,000 pounds, gross vehicle weight (as a truck).

THORNTON "BIG BOGIE" UNIT recommended for loads up to 30,000 pounds, gross vehicle weight (as a truck).

EVERY DAY, in dozens of industries, shrewd operators are finding the answer to their truck problems in the dependable, year-'round, heavy-duty performance and economy of lighter trucks with Thornton Four-Rear-Wheel Drive engineered into the original chassis.

Thornton engineering permits extra carrying capacity, of course—but of greater importance, it provides *double the power to pull it* where there isn't a road—and *plenty of speed* on the highway.

Thornton Four-Rear-Wheel Drive is considerably more than a third axle, more than a dual-ratio transmission, more than a piece of equipment attached to a truck chassis. It is a thoroughly engineered installation which affords the operator distinct performance advantages over large, heavy-duty, single-driving-axle trucks of equal rated capacity—with substantial savings in initial cost and expense of operation and maintenance.

Before buying that big, expensive truck, see proof of the extraordinary results delivered at low cost by the 1½-to-3-ton truck—Thornton-eered.

CHOOSE YOUR 1½- to 3-TON CHASSIS..have it

THORNTON TANDEM COMPANY
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Distributors in every large industrial center

SEE THE THORNTON DISPLAY AT THE ROAD SHOW—SPACE B-19

THORNTON-eered

WHAT ABOUT THE BUSINESS AND ECONOMIC QUESTIONS OF THE SAND AND GRAVEL AND READY MIXED CONCRETE INDUSTRIES?.....

Market in 1938

What will be the volume of demand in 1938? Will there be any stimulation in the industrial building market and other sources of private building? To what extent will the Federal Government finance public works? Will states and other subdivisions of government resume their former activity in the public works field?

AS to 1937

What actually happened in the sand and gravel and ready mixed concrete industries in 1937? What was the volume of business and how did it compare with 1936? How serious was the decline in demand because of the business recession starting in September?

Prices

How did selling prices in 1937 compare with the preceding year? What is the price outlook for 1938? What form of cooperation will improve competitive conditions within the framework of the antitrust laws? To what extent did the sand and gravel industry suffer from governmental plants or from portable plants erected for specific projects?

Results of Governmental Policies

Are the policies of the Federal Government contributing to such uncertainty in business that the construction program of the country is demoralized? What can be done to restore business confidence and thus release the great demand for building now admitted to exist? Can we expect any immediate results from Federal stimulation of home building? Is there any prospect of arresting the diversion by State governments of highway funds? To what extent has the diversion evil curtailed normal markets for the sand and gravel and ready mixed concrete industries in the highway and street building fields?

Labor Relations

What is the present status of employer-employee relations in the sand and gravel and ready mixed concrete industries? In how many communities have contracts been signed between the industries and organized labor? What is the nature of those contracts and what events preceded their signature? What are typical provisions for wages, hours, furlough, discharge, seniority, arbitration of disputes? Do the contracts provide for the open or closed shop, for the check-off, plant stewards? Have the contracts been between AFL or CIO unions? Have boycott threats been used, and if so, with what success? What do Federal and State laws require of employers as to collective bargaining?

This will give you an idea of just some of the important questions which will be discussed at the Twenty-second Annual Convention and Exposition of the National Sand and Gravel Association and the Eighth Annual Convention and Exposition of the National Ready Mixed Concrete Association, to be held concurrently at the Netherland Plaza Hotel, Cincinnati, Ohio, on January 31, February 1, 2, and 3, 1938. In the November and December issues of this magazine we told you about the legislative and engineering phases of the programs, and we want to remind you once more of the fine exposition of machinery and equipment used in the industries, in which leading manufacturers will participate. All these things combine to make events in Cincinnati of extraordinary importance to you.

All members of the sand and gravel and ready mixed concrete industries are cordially invited to be present.

MAKE YOUR PRESENT AVAILABLE MATERIALS

pay you bigger profits

SELL PLANT-MIXED CALCIUM CHLORIDE STABILIZED SOILS

Aggregate producers! Pit and quarry owners! There *is* something new—something profitable in the aggregates business.

Government, state and county officials now know there is no method of building low-cost roads so practical, so successful as with soil-stabilization.

Almost every aggregate producer has most of the equipment necessary to build a mixing plant which will deliver finished stabilized soil mixtures, ready to apply to road surfaces.

Demand for plant-mixed materials grows by leaps and bounds. New markets for parking lots, factory yards, driveways and alleys are adding to the demand. Millions of yards of discarded pit overburden, washed out residue, obnoxious clay may all go back into the mixer and come out in the form of stabilized soil—the highest grade, low-cost road ever developed—the greatest discovery in road construction in years.

Get into soil stabilization now. Send for complete information on how to equip your plant—how to produce proper mixtures. Literature and sales plans to help you develop the market locally will be supplied.

Learn the facts at once. Write to any association member.

CALCIUM CHLORIDE ASSOCIATION

The Columbia Alkali Corporation . Barberton, Ohio
The Dow Chemical Company . Midland, Michigan
Michigan Alkali Co. . 60 E. 42nd St., New York City
Solvay Sales Corp. 40 Rector St., New York City

A popular mixing plant set-up

CALCIUM CHLORIDE

FOR STABILIZING ROAD SURFACES

A PROVEN *Business Opportunity* FOR 1938

From many towns of a few thousand population to the largest cities, the ever-growing demand for Jaeger Dual-Mix Higher Strength Concrete, replacing bulk materials, offers one of the outstanding opportunities for sound and profitable new business investment and the expansion of existing concrete plants.

HERE IS HOW DEMAND FOR JAEGER TRUCK-MIXED CONCRETE GROWS AND GROWS

These 25 Typical Operators Have Ordered and Reordered an Average of 5 Times Each, for a Total of 409 Jaeger Units

Atlanta Aggregate Co., Inc., Atlanta, Ga.	Has Placed	3	Orders, for a Total of	6 Jaeger Units.
Beckley-Myers, Springfield, Ohio	Has Placed	3	Orders, for a Total of	5 Jaeger Units.
C. W. Blakeslee, New Haven, Conn.	Has Placed	4	Orders, for a Total of	10 Jaeger Units.
W. H. Brant & Sons, Inc., West View, Pa.	Has Placed	5	Orders, for a Total of	5 Jaeger Units.
Brooks-Wright, Inc., Paterson, N. J.	Has Placed	3	Orders, for a Total of	4 Jaeger Units.
J. P. Callaghan Co., Newark, N. J.	Has Placed	4	Orders, for a Total of	17 Jaeger Units.
Clark Transportation Co., Honolulu, H. I.	Has Placed	4	Orders, for a Total of	12 Jaeger Units.
Cline & Ellis, Raleigh, N. C.	Has Placed	2	Orders, for a Total of	6 Jaeger Units.
Consolidated Rock Products Corp., Los Angeles, Calif.	Has Placed	2	Orders, for a Total of	14 Jaeger Units.
Dufferin Paving & Crushed Stone Co., Ltd., Toronto, Ont.	Has Placed	4	Orders, for a Total of	26 Jaeger Units.
Fort Worth Sand & Gravel Co., Ft. Worth, Tex.	Has Placed	5	Orders, for a Total of	17 Jaeger Units.
Goff-Kirby Co., Cleveland, Ohio	Has Placed	3	Orders, for a Total of	10 Jaeger Units.
Graham Bros., Los Angeles and Long Beach, Calif.	Has Placed	6	Orders, for a Total of	16 Jaeger Units.
Haden Co., Houston, Tex.	Has Placed	10	Orders, for a Total of	22 Jaeger Units.
Howard Concrete Producing Co., Cincinnati, Ohio	Has Placed	10	Orders, for a Total of	21 Jaeger Units.
Keefner Concrete Co., Des Moines, Ia.	Has Placed	8	Orders, for a Total of	11 Jaeger Units.
Knoxville Sangravl Material Co., Knoxville, Tenn.	Has Placed	4	Orders, for a Total of	6 Jaeger Units.
Kuhlman Builders Supply & Brick Co., Toledo, Ohio	Has Placed	9	Orders, for a Total of	16 Jaeger Units.
P. W. Lambert & Co., Linden, N. J.	Has Placed	3	Orders, for a Total of	7 Jaeger Units.
Maloney Concrete Corp., Washington, D. C.	Has Placed	7	Orders, for a Total of	44 Jaeger Units.
J. & I. O'Rourke, Flushing, L. I.	Has Placed	6	Orders, for a Total of	28 Jaeger Units.
Richter Transfer Co., Cincinnati, Ohio	Has Placed	12	Orders, for a Total of	40 Jaeger Units.
Ryan Ready-Mix Concrete Co., Brooklyn, N. Y.	Has Placed	7	Orders, for a Total of	22 Jaeger Units.
H. L. Seabright Co., Wheeling, W. Va.	Has Placed	18	Orders, for a Total of	22 Jaeger Units.
Warner Co., Philadelphia, Pa.	Has Placed	8	Orders, for a Total of	22 Jaeger Units.

Jaeger Truck Mixers and Agitators give you a RECOGNIZED ADVANTAGE in selling ready-mixed — a stronger, more workable concrete, preferred by both engineers and contractors, produced by the most efficient, low cost mechanism ever developed for mixing and delivering concrete. Write for our Catalog. Its information is authoritative and complete. THE JAEGER MACHINE CO., 602 Dublin Avenue, Columbus, Ohio.

WORLD'S LARGEST

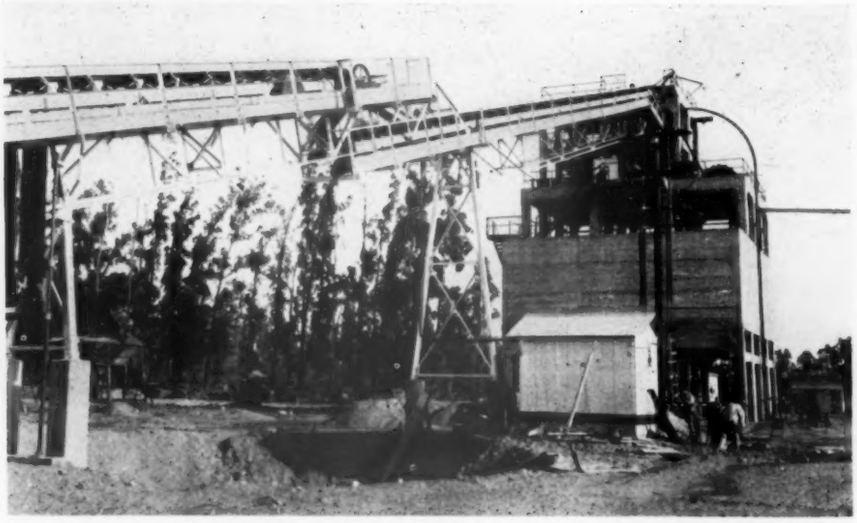
LEADS IN U.S. and ABROAD

JAEGER TRUCK MIXERS

BUILT IN 1½-2-3-4-5-6 CU. YD. SIZES — END OR SIDE DISCHARGE

Aggregates in 1937 . . .

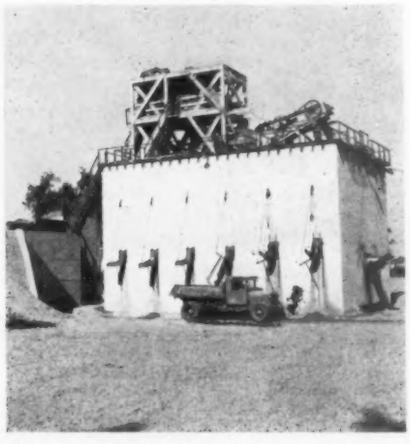
Many New Plants Erected; Activity General Through Country . . . Trend toward By-Products Manufacture by Operators Noticeable



The new plant of the Saticoy Rock Co. near El Rio, Cal., shown near completion. Pit for surge stock-pile in foreground.

THE demand for sand and gravel, crushed stone and slag during the first half of 1937 continued the sharp upward trend begun in 1936. A falling off in the demand near the end of the operating season did not prevent the year's production from exceeding that of 1936. No official production figures for the year are yet available, but it is certain that 1937 was by far the best year the industry has seen since the depression. Prices averaging slightly above those of the preceding year enabled most producers to show a reasonable profit from their operations.

Profitable operation in 1936 was largely responsible for the construction of many new plants and the improvement of hundreds of others during the past year. Most of the new plants were of small or medium size and were built to supply comparatively small territories. An outstanding development of the year was the large number of producers engaging in the manufacture of various by-products. Dozens of sand-and-gravel and crushed-stone producers acted upon their convictions that the producer located near a market for ready-mixed concrete, concrete products, bituminized aggregates, etc. is in an advantageous position to manufacture these by-products.



New plant of the Central Rock & Sand Co. at Sanger, Cal.

The new 100-ton per hr. plant of the Bellamy Sand & Gravel Co. at Correctionville, Ia., was described in the December 1937 issue of PIT AND QUARRY. This plant is of added interest because of provisions for recovering gold which forms a profitable side-line. Two P & H drag-lines load gravel into cars which are hauled to the plant by a Plymouth gasoline locomotive. A Simplicity vibrating screen, a Link-Belt shaker picking table and a gyratory crusher prepare the material for the plant. An Iowa Mfg. Co. Symons screen, a Link-Belt rotary scrubber, a Link-Belt conical screen and two Link-Belt Shaw classifiers complete the equipment. Cincinnati Rubber Co. conveyor belting is used.

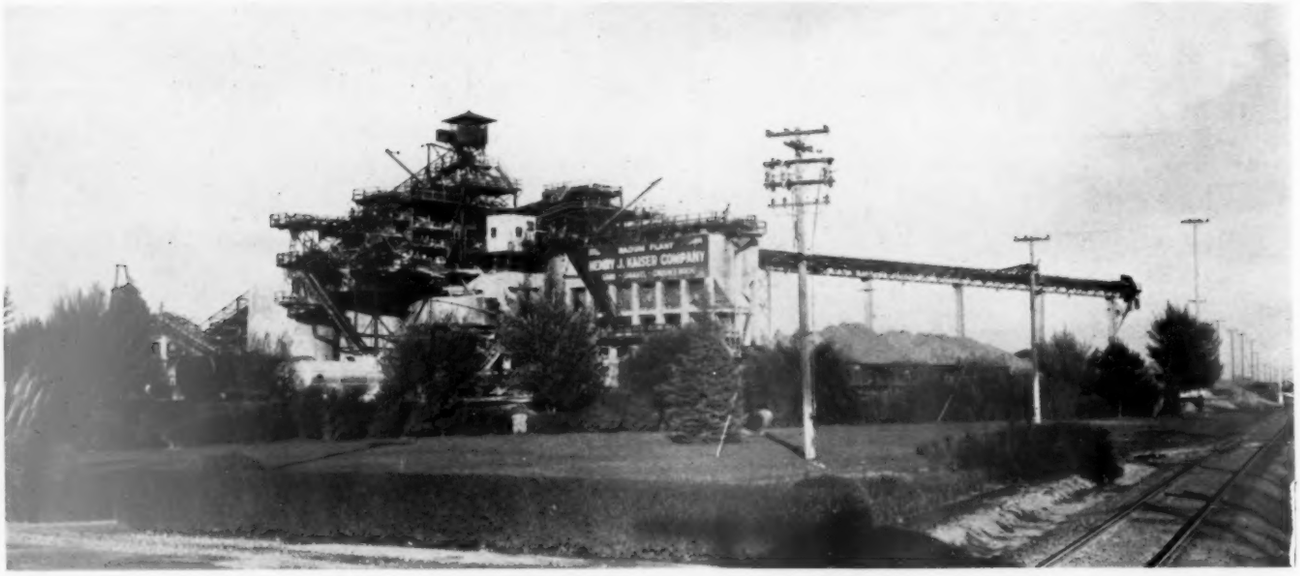
One of the most interesting new plants of the year was built by the Saticoy Rock Co. near El Rio, Cal. A drag-line loads the cars which are hauled to the plant by a Plymouth locomotive. An Alloy Steel Foundry Co. jaw crusher reduces the gravel before it is conveyed to the screens. Three Stephens-Adamson vibrating screens and an Allis-Chalmers Newhouse crusher are used to prepare the gravel, and the sand is classified by a sand wheel of original design.

The revolving screen and scrubber with vibrating screen above at Bellamy plant.

Flume lined with long-nap carpeting which recovers gold from the wasted fines.

The Negley Sand & Gravel Co., East Liverpool, O., built a new plant using Columbus Conveyor Co. equipment.

The Hurst Sand & Gravel Co. at Springfield, O., built a new plant using Deister Machine Co. vibrating screens, Columbus conveyors, a Blaw-Knox bin, a New Holland roll-crusher, and a 5-cu. yd. Sauerman Crescent scraper.



The plant of the Henry J. Kaiser Co. at Radum, Cal., which now has the largest productive capacity of any sand-and-gravel plant in this country.

New plants were also built by the La Crosse Sand & Gravel Co. at La Salle, Wis., and B. P. Nichols at Marianna, Fla.

A small new plant of modern design and construction was put in operation in 1937 by the Central Rock & Sand Co. at Sanger, Cal. Allis-Chalmers jaw and gyratory crushers and a Low-Head screen are the major equipment units in this plant. All the material is shipped in trucks which are weighed on a new 20-ton Fairbanks scale.

The Northwestern Gravel Co. built a new all-steel semi-portable plant near Lake View, Ia. Three Universal vibrating screens, and crushing and washing equipment are used.

Brand & Deal, Elkhart, Ind., bought a 38-V Pioneer portable crushing and screening plant. The Licking Sand & Gravel Co. bought an Iowa Mfg. Co. portable plant. The Winona Sand & Gravel Co., Rockford, Ia., also bought a portable plant.

The W. E. Hall Co. built a new sand-and-gravel plant and an aggregate-bituminizing plant at Phoenix, Ariz. The Conveyor Co. supplied much of the equipment.

The Anderson Sand & Gravel Co. of Rockford, Ill., has just completed a new sand-and-gravel plant which is centered about a No. 2 Kern tower system. The Sun Sand Co., Thayer, W. Va., recently installed Neff & Fry concrete stone bins and a Hydroseal dredge pump.

The new plant of the Crown Building Materials Co. in Columbus, O., uses a 1-cu. yd. Sauerman slack-line cableway excavator. The first sizing is done by a 3-ft. by 8-ft. Symons vibrating screen. The oversize is crushed and then sized by a 3-ft. by 12-ft. screen. The six concrete storage silos were manufactured and built by the Marietta Concrete Corp. and the plant was designed by the Milburn Machinery Co., which also supplied most of the equipment.

The new plant of the Crown Building Materials Co. at Columbus, O.

The traveling tripper stacker used for stock-piling at the plant of the Henry J. Kaiser Co.

The Blue Diamond Corp. built at Arcadia, Cal., a new plant, which has a capacity of about 200 tons per hr.

The Henry J. Kaiser Co. in 1937 made a number of improvements to its Radum, Cal., sand-and-gravel plant, which increased its capacity to over 1,000 tons per hr. and further added to its already wide range of products. In the pit a Marion 7½-cu. yd. electric drag-line now does the loading. The overburden is removed by a Monighan drag-line with a 5-cu. yd. Elec-

tric Steel Foundry Co. bucket. All the pit belt-conveyors have been widened to carry the increased load. Four new Symons screens, a Niagara screen and four screens from the Bonneville Dam plant were also installed. An aggregate-bituminizing plant and a traveling stacker for storage were added during the year. Two new Plymouth locomotives with Caterpillar Diesel engines were also purchased.

This company also built at Olympia, Cal., a new sand plant, which has a capacity of 200 tons per hr. A Buffalo Niagara screen, Bodinson rake classifiers, Dorr bowl and rake classifiers, and a Dorr clarifier are used in this plant.

The new sand plant of the Henry J. Kaiser Co. at Olympia, Cal., with stock-piling conveyors at left.

L. H. Chandler built a new 100-ton per hr. plant at Lomita, Cal. The material is excavated by a 1-cu. yd. Le Clair scraper, and the sizing is done by two new Stephens-Adamson Gilbert conical screens. Sand-drags produce two grades of sand. Truck shipments are weighed on a Fairbanks scale.

While not a commercial operation, the M.W.A.K. sand-and-gravel plant which has supplied all the aggregates for the Grand Coulee Dam in Washington, is always of interest to producers because of the many original operating methods used. A number of changes have been made in this plant since it was built in 1935. A dearth of gravel in the deposit made it necessary to install equipment early in 1937 to reclaim the bowlders formerly wasted. A jaw crusher breaks these bowlders before they go on the field conveyors and a second Telsmith gyratory crusher was installed in the plant to handle this extra load. Four Allis-Chalmers Style B vibrating screens replaced the four original coarse screens following these crushers. Sand-boxes were installed to remove excess sand.

The Ohio Gravel Co., Cincinnati, O., in 1937 bought three Robins Eliptex screens and installed a Merrick Weightometer to weigh outgoing railroad shipments. The Manning & Locklin Gravel Co. enlarged and modernized its plant at Northville, Mich. The Eugene Sand & Gravel Co. installed two Simplicity screens at its Independence, Ore., plant and bought an Insley shovel for its Eugene, Ore., plant.

The Latta Brook Sand & Gravel Co., in 1937 was forced to move its plant at Elmira, N. Y., to a new site near Horseheads, N. Y., because of a landslide.

John D. Gregg in 1937 made many improvements to his plant at Roscoe, Cal. A Lima 1½-cu. yd. electric shovel and a novel movable hopper were installed in the pit. Another addition was a Conveyor Co. sand classifier.

The Buffalo Sand Co. built a new dredge for its plant at Lancaster, N. Y. The Allen-Sherman-Hoff 10-in. Hydroseal pump has a manganese-steel shell and Maximix rubber lining. It is driven by a 200-hp. Cummins 6-cyl. Diesel engine which also drives the other dredge equipment. A description of this operation was published in the October, 1937 issue of PIT AND QUARRY.

The vibrating screens which perform first sizing at Coulee Dam gravel plant.

Several problems which often face aggreggates producers came up during 1937 at the plant of Smith Bros. at Winfield, Pa. The quarry operations had reached a point where the use of trucks for the delivery of the stone to the plant was no longer practical. Increased demand had also made it impossible for the crushers at the plant to carry the load. This problem was solved by installing a primary crusher in the quarry and delivering its 6-in. product to the plant on an inclined belt-conveyor. Sprout-Waldron conveyor idlers with Hyatt bearings are used. The trucks now deliver the quarried rock to the primary crusher.

The Pekin Stone Products Corp. built a new plant at Lockport, N. Y. Two crushers, a revolving screen and a vibrating screen were installed.

The Pennington Trap Rock Co. in 1937 put in operation what is essentially a new plant at Pennington, N. J. An old plant was dismantled and a new plant of 250-ton per hr. capacity,

The John D. Gregg plant at Roscoe, Cal., with separate departments for crushed and uncrushed material.

The 200-hp. Diesel engine and the 10-in. rubber-lined centrifugal pump on the new dredge of the Buffalo Sand Co. at Lancaster, N. Y.

about half that of the old plant, was built. Most of the plant equipment is new. A Farrel-Bacon jaw primary crusher, a Symons short-head cone crusher, four secondary crushers, two Symons screens, a Robins Gyrex screen and Robins conveying equipment are used. Easton steel end-dump bodies are used on the quarry trucks.

R. M. McDonough installed a Williams hammer-mill and a 150-hp. International gasoline engine in his crushed-stone plant near San Antonio, Tex.

Belt-conveyor at Smith Bros. plant connecting with primary crusher in quarry.

The Blair Limestone Co., Martinsburg, W. Va., built a new crushing-and-screening plant and now has under construction a new washing plant.

The Weston & Brooker Co. bought two Mack trucks with Easton bodies for its Cayce, S. C., plant.

The Massachusetts Broken Stone Co. installed two Kennedy-Van Saun crushers and five vibrating screens of the same make at its plant at Stonybrook, Mass.

The Bound Brook Crushed Stone Co., Morristown, N. J., installed a Robins Gyrex screen and conveyors. The Consolidated Stone & Sand Co., Montclair Heights, N. J., installed a 6-ft. by 14-ft. Robins Gyrex screen.

The Victoria Gravel Co. is reported to have built a stone crushing and screening plant near Burnet, Tex. The San Gorgonio Rock Products Co. built a small dolomite plant near Riverside, Cal.

The General Crushed Stone Co. bought a fleet of Easton Phoenix 10-cu. yd. semi-trailers for its Rock Hill quarry near Quakertown, Pa.

The Monmouth Stone Co., Monmouth, Ill., in 1937 rebuilt its plant, which was originally put in operation in 1935. Two Austin-Western jaw crushers and a roll-crusher were installed.

The Douds Stone Co., Douds, Ia., bought a McLanahan roll-crusher and feeder and a Tyler Niagara screen. Belt-conveyors were also installed.

The Stockbridge Stone Co., Stockbridge, Ga., added two Farrel-Bacon jaw crushers and a Symons cone crusher. Other improvements were also made.

The Schumacher Stone Co., Pandora, O., installed a Pioneer roll-crusher. A Symons cone crusher was installed by the National Lime & Stone Co. in its Rimer, O., plant. A subsidiary, the Ohio Blue Limestone Co., Marion, O., installed two Robins vibrating screens.

Gastonia Quarries, Inc., Gastonia, N. C., overhauled its entire plant and installed a Universal roll-crusher and conveyors.

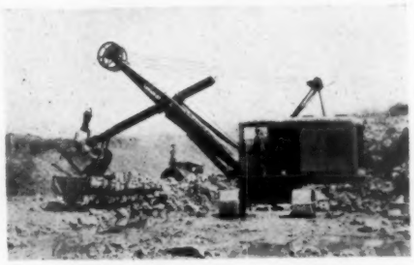
The Newton County Stone Co., Kentland, Ind., installed new crushers and vibrating screens.

The Cushing Stone Co. built new crushed-stone and aggregates-bituminizing plants at East Branch, N. Y.

The Standard Slag Co. built a new slag plant at Ashland, Ky., to replace a plant destroyed by fire. A Symons cone crusher and two Nordberg Symons screens were installed.

The Baxter Chat Co. is building near Freece, Kan., a new tailings plant, which will have a capacity of 60 tons per hr.

Increased prosperity of the farmers



New 2-cu. yd. shovel in quarry of the Union Limestone Co.

was probably largely responsible for an increased demand for agricultural limestone. Many producers installed equipment for the manufacture of this product. The Eastern Rock Products Co. of Utica, N. Y., installed a Kennedy-Van Saun tube-mill for this purpose. The Herzog Lime & Stone Co. made a $60,000 addition to its plant at Forest, O., and drying and pulverizing equipment was installed. The Radford Limestone Co., Radford, Va., bought an Allis-Chalmers rod-mill to make stone sand. A Williams hammer-mill was installed by the St. Joseph Quarries Co., St. Joseph, Mo. and a pulverizer and other equipment were added by the Cerulean Stone Co., Cadiz, Ky. The Carbon Limestone Co. at Hillsville, Pa., erected a 90-ft. by 150-ft. agricultural-limestone bin with a capacity of 20,000 tons and installed several Robins vibrating screens.

The Dolese & Shepard Co. installed additional equipment for pulverizing

limestone at its McCook, Ill., plant. Two Robins Gyrex screens were included.

H. E. Millard in 1937 installed equipment in his pulverized-limestone plant near Annville, Pa., which increased its capacity considerably. The original Bethlehem pulverizer in this plant was supplemented by a new 8-ft. by 8-ft. Kennedy-Van Saun ball-mill which has a capacity of 25 tons per hr. when grinding nearly 100 per cent. through 200-mesh. The original rotary drier is still used, but a Kennedy-Van Saun tower drier, 6 ft. square by 55 ft. high, was added. A second Bates packer was also installed.

The Koenig Coal & Supply Co.,

New 4-cu. yd. electric shovel in the quarry of the Kingston Trap Rock Co.

which has operated a ready-mixed-concrete plant in Detroit since 1934, in 1937 built two new concrete plants. Butler Bin Co. bins and batchers are used in all these plants. The McCrady-Rodgers Co. built a concrete plant in Pittsburgh, Pa., using Blaw-Knox equipment. The Triangle Rock & Gravel Co., San Bernardino, Cal., formed a new division, Triangle Certified Concrete, Inc., and bought two 3-cu. yd. Jaeger truck-mixers. The Tri-County Sand Co., Fittstown, Okla., put in service a new ready-mixed-concrete plant and six truck-mixers. The Erie Steel Construction Co. sold ready-mixed-concrete plants to the Sherman Sand & Gravel Co., New Britain, Conn., and the Brooks-Wright Co., Paterson, N. J. The Moraine Sand & Gravel Co., Dayton, O., bought four Jaeger truck-mixers. Others entering this business during the year were: the Middletown Sand & Gravel Co., Middletown, O.; the Smith-Petersen Sand & Gravel Co., Reno, Nev.; Arkhola Sand & Gravel Co., Fort Smith, Ark.; Grant-Service Rock Co., Fresno, Cal.; Morse Sand & Gravel Co., Inc., Pawtucket, R. I.

Below are listed a few of the many aggregates producers who in 1937 either entered the products business or expanded their operations in these side-lines. These products include ready-mixed concrete, concrete products, bituminized aggregates, etc. Crushed-stone producers were represented by the Edward Balf Co., Hartford, Conn., which added three 3-cu. yd. Chain Belt Rex truck-mixers to its fleet, by the Fanwood Stone Crushing & Quarry Co., Westfield, N. J., which added three 3½-cu. yd. Rex truck-mixers, and by the Kingston Trap Rock Co., which built a new batching plant and bought two 4-cu. yd. and two 6-cu. yd. Jaeger truck-mixers mounted on White trucks. The National Lime & Stone Co., Lima, O., installed a new plant and two Concrete Transport Mixer Co. trucks. The J. W. Brannan Sand & Gravel Co., Denver, Colo., and the Utah Sand & Gravel Products Co., Salt Lake City, Utah, also built new concrete plants.

The Blaw-Knox Co., supplied new ready-mixed-concrete plants to the Arundel-Brooks Corp., Sparrows Point, Md., H. T. Campbell & Sons, Towson, Md., and the Michigan Limestone & Chemical Co., Buffalo, N. Y. Blaw-Knox Trukmixers were also sold to most of these companies.

The New York Trap Rock Corp. erected a Blaw-Knox ready-mixed-concrete plant at Hackensack, N. J., and a Warren Bros. aggregates-bituminizing plant at Stoneco, N. Y.

Perhaps the most important new concrete-products development by an aggregates producer was the new plant of the Basalt Rock Co. at Napa, Cal., for the manufacture of "Basalite" light-weight concrete blocks.

The new 1½-cu. yd. shovel in the John D. Gregg pit moving the pit hopper to a new location.

The Quartzite Stone Co., Lincoln, Kan., and the Jones Sand Co., Inc., Norfolk, Va., installed Dunbrik machines. Gifford Hill & Co., Dallas, Tex., has a subsidiary, the Gifford Hill Pipe Co., making concrete pipes. The Southeastern Sand & Gravel Co., Milstead, Ala., built a new concrete-pipe plant and the Caruthersville Sand & Gravel Co., Caruthersville, Mo., installed equipment to treble its output of concrete blocks. The new concrete-pipe plant of the Gravel Products Corp. at Tonawanda, N. Y., was described in the November 1937 issue of PIT & QUARRY.

The new ready-mixed-concrete batching plant of the McCrady-Rodgers Co. at Pittsburgh, Pa.

A number of crushed-stone producers installed dust-collecting systems during the year. The General Crushed Stone Co. made installations of Norblo dust-collectors in its plants at Jordanville and Auburn, N. Y., and a Sly dust-collector at Geneva, N. Y. A Pangborn dust-collector was installed by the Foxon Trap Rock Co., Inc., New Haven, Conn.

Many producers purchased new shovels, cranes and drag-lines during the year. The Union Quarries Co., Van Wert, O. bought a Marion 1½-cu. yd. Marion gas-electric shovel, a Deister Plat-O screen, and an Allis-Chalmers No. 6 Gates crusher for its plant at Sherburn, O. The Kingston Trap Rock Co. installed a Marion 4161 electric shovel with a 4-cu. yd. dipper as well as two Kennedy gearless gyratory crushers at its Kingston, N. Y. plant. Two new Marion electric shovels were placed in operation in the Hillsville, Pa., quarry of the Pittsburgh Limestone Corp. One of these has a 4-cu. yd and the other a 5-cu. yd. dipper. The Pittsburgh Limestone Corp. bought three Marion Type 361 electric tunnel shovels for its limestone mines in Western Pennsylvania. The Cushing Stone Co., Schenectady, N. Y., bought a 1½-cu. yd. Thew Lorain Diesel shovel and the Union Limestone Co., bought a 2-cu. yd. Lorain 87 shovel. Gottron Bros., Inc. bought a General ½-cu. yd. clam-shell crane.

The Central Rock, Inc., Lexington, Ky., the Southern Limestone Co., Harriman, Tenn., and the Kentucky Stone Co., Stephensburg, Ky., in 1937 bought ⅜-cu. yd. Bucyrus-Erie shovels.

The Moulding-Brownell Corp. in 1937 placed in operation a Marion Type 39-A drag-line at its Cayuga, Ind., sand-and-gravel plant. This machine has an 80-ft. boom and a 3-cu. yd. bucket. The Grand River Gravel Co. installed a Marion 351 drag-line with a 50-ft. boom and a 1¼-cu. yd. bucket in its Ionia, Mich., pit. The Grand Rapids Gravel Co., Grand Rapids, Mich., bought a Bucyrus-Erie ⅝-cu. yd. shovel, as did the Miller Gravel Co., Davison, Mich.

The Maryland Slag Co. bought a Marion 4161 electric shovel with a 4½-cu. yd. dipper. This machine is used to dig hot slag for its plant at Sparrows Point, Md. The Great Lakes Steel Corp., Detroit, Mich., bought a Marion 480 electric shovel with a 2-cu. yd. dipper and Ward-Leonard control. This machine is also used to excavate slag.

The Columbia Quarry Co. made its third installation of Diesel engines in the last ten years when it installed a Diesel generating plant at Valmeyer, Ill. This installation consists of two National Supply Co. Superior Diesel engines connected to alternating-current generators. One engine is rated at 525 hp. and the other at 400 hp.

The Raabe Stone Co., Fort Jennings, O., installed a 165-hp. Victor Diesel engine and the Sidney Washed Sand & Gravel Co., Sidney, O., installed a French Co. 125-hp. Diesel engine.

Lime *(from page 80)*

were made in so many other plants that it is impossible to record them all. The American Lime & Stone Co., whose plant near Bellefonte, Pa., remains one of the most important commercial lime plants in this country, further improved its operations during the year. Two 42-in. Fuller mills were installed and a 5,500-ton reinforced-concrete lime-storage silo was built. This silo is 50 ft. in diameter and 125 ft. high and is said to be the largest lime-storage bin ever built.

The National Gypsum Co. continued its extensive improvement program begun in 1936, which affects all its gypsum and lime plants. At the Luckey, O., lime plant a Williams No. 5 hammer-mill was installed and four Arnold & Weigel shaft kilns were built.

One of the lime pulverizers in the plant of the Gibsonbury Lime Products Corp.

The Limestone Products Corp. of America, which in 1935 completely rebuilt its plant at Newton, N. J., installed an additional rotary lime kiln. The Ohio Hydrate & Supply Co. further improved its plant by the installation of a Greenville roll-crusher, two Allis-Chalmers and two Simplicity vibrating screens and a 35-ft. Bartlett & Snow rotary drier.

The Washington Building Lime Co. installed a Raymond bowl mill in its plant at Angle, W. Va. A second Raymond bowl mill was installed in the plant of the Marble Cliff Quarries Co., Columbus, O.

The Limeton Lime Co., Limeton, Va., recently installed a Kuntz lime-hydrating system made by Lime & Hydrate Plants, Inc. Similar systems were installed by the Salem Lime & Stone Co., Salem, Ind., and the J. E. Baker Co., Billmyer, Pa.

The Southern States Lime Corp., Crab Orchard, Tenn., is making extensive improvements which will double the capacity of its hydrating plant. The Lee Lime Corp., Lee, Mass., built a plant for the production of pulverized limestone. The Hoosac Valley Lime Co., Adams, Mass., installed pulverizing and other machinery for the production of agricultural limestone.

New Silicosis Text

Every producer of non-metallic minerals should have a copy of and be familiar with Bulletin 400 of the U. S. Bureau of Mines entitled, *Review of Literature on Effects of Breathing Dusts with Special Reference to Silicosis* by Daniel Harrington and Sara J. Davenport. It is for sale by the Superintendent of Documents, price 25c.

This 305-page document, according to the authors, is "an attempt to assemble information in convenient form on effects of breathing dusts, largely in the mining and allied industries. The literature on this subject is so extensive that no attempt has been made to include all published material or all types of dust diseases but only to assemble some of the more outstanding data on several aspects of the subject, especially with reference to silicosis."

In spite of this modest assertion, the subject is exceedingly well covered. Emphasis is placed on "Prevention of dust diseases" although much space is devoted to "Physiological effects of breathing dust," "Economic and legal aspects of dust diseases in industry," and "Cost of compensation for silicosis."

This bulletin undoubtedly will be the first authority one will reach for when some question relating to dust requires solution. Its usefulness will extend beyond the engineer interested in preventive measures and that in any litigation touching upon the subject of dusts, litigants will refer to this comprehensive bulletin on dust diseases and control.

Gypsum, Etc. (from page 76)

ability to solve it. The West-Land Security Co., Inc. first found a way to do this and then built its plant at Tarbutton, Tex. This plant went into operation in 1937. Deister Concentrator Co. Leahy screens, Deister-Overstrom diagonal-deck concentrating tables, Dorr bowl and rake classifiers, and a Dorr thickener are used.

Producers of silica sand were active in 1937 and many important improvements were completed or are under way. The Birmingham Slag Co., one of the largest producers of sand and gravel and slag in the South, has started construction on a new silica plant at Mohawk, Ala. This plant will be operated by an affiliate, the Mohawk Silica Corp.

The Century Silica Co. which took over the plant and property of the Foxburg Silica Co. at Foxburg, Pa., is completely rebuilding the plant. Buchanan crushers, Hardinge rod mill, drier and classifiers, Stephens - Adamson screens and Redler conveyors are being installed. A gloryhole is also being developed.

The Standard Silica Corp., Ottawa, Ill. was very active in several ways. During the year this company junked its oldest plant and improved its newest plant by the installation of a second Hardinge pebble mill and several Blaw-Knox dust collectors. This company recently awarded a contract for the construction of a new mill for the production of silica "flour."

The Ottawa Silica Co., Ottawa, Ill., in 1937 bought a Le Tourneau Angledozer and a U-12 Carryall scraper for the removal of overburden.

The Mineral Products Co., Hot Springs, Ark., installed two Raymond separators, 8-ft. and 10-ft., each equipped with a double Whizzer.

The Pennsylvania Glass Sand Co. in 1937 bought four Lorain shovels for its various operations. A 1½-cu. yd. Lorain 77 Diesel shovel and a fleet of Easton dump trailers was purchased for the plant at Mapleton Depot, Pa.

Hopeful Future Seen for Kyanite Industry

Although the domestic kyanite industry is still in the development stage, investigations and experiments of several units of the Bureau of Mines signify an encouraging economic future for this industry. The concentration and preparation of domestic kyanite has been investigated intensively by the Bureau in the past several years and certain conclusions have been reached. It is expected that details of the studies and experiments will be given in a proposed kyanite bulletin. Meantime, a preliminary account has been given by Oliver C. Ralston in the annual report of the Nonmetals Division, Fiscal Year 1937, from which the following notes are abstracted:

Kyanite occurs from Alabama to Maine in schists, and numerous areas contain deposits of milling-grade ore of great magnitude, but the American kyanites have not been as popular as the Indian kyanites because the American kyanites, upon burning, are converted into weak grains, whereas Indian kyanite retains much of its natural strength.

However, research and experiments have revealed a succesful method of concentration and preparation. Kyanite ores from California, Arizona, Alabama, Georgia, Tennessee, South Carolina, and Virginia have been concentrated by froth flotation and agglomeration.

Ordinarily, kyanite ores show bladed crystals, but some fibrous kyanite resembles sillimanite and is frequently mistaken for it. The common gangue minerals of kyanite are quartz, muscovite, biotite, garnet, oxidized iron minerals, and clay. The ore milled at Celo Mountain, near Burnsville, N. C., contains as many as 26 minerals but this is unusual. Kyanite crushes into splinters and long shapes, which are difficult to concentrate by any gravity process in spite of the higher specific gravity of kyanite. This causes great loss of the kyanite if a satisfactory grade of concentrate is made, as only the more blocky particles enter the finished concentrate. Consequently, froth flotation and similar processes have proved more important. Virtually all kyanite ore can be concentrated by froth flotation to give a concentration of more than 90 per cent. purity with extraction of similar magnitude. Moreover, as high as 98 per cent. purity can be obtained with over 90 per cent. extraction.

Agglomerate tabling, which depends on filming kyanite selectively with suitable reagents, followed by addition of enough fuel oil to agglomerate the filmed material in preparing it for treatment on a concentrating table, has also proved practical. As flotation concentrate is not acceptable to brickmakers who require grog aggregate of the refractory substance, A. Gabriel and J. E. Norman, at the Bureau's New Brunswick Experiment Station, undertook the problem of converting finely ground kyanite into coarse calcined material.

The usual binder for kyanite grog brick made from Indian kyanite is about 20 per cent. of refractory clay, but as it is not entirely satisfactory, a binder was sought that could be mixed with finely-powdered kyanite to make bats for firing into a strong grog. Twelve years previously the Bureau, when working on binders for coarse kyanite, had found 10-per cent. magnesia suitable. This was tested and found workable, except that the magnesia should be reduced to as little as 4 per cent. with kyanite fines and finely divided magnesium oxide. Compression of the mixtures was necessary for satisfactory contact. The small trial briquettes fired to excellent material of almost porcelainlike hardness. However, the crushed-and-sized grog was found to be subject to the usual heat shock of magnesia. When talc was substituted for magnesia, in equal weights, it gave a product not subject to heat shock, but it did not possess the wet-working characteristics necessary in pressing shapes. Addition of about 2 per cent. bentonite, in the face of the fact that its alkali content would act as a flux, gave enough plasticity to the mix, and there was no apparent loss in refractoriness. The resulting material gave excellent grog that would withstand well the 25 cycles of heating and chilling demanded in glass-tank block specifications. In fact, 35 cycles between 850 deg. C. and room temperature were used as a test. As the bats fired for grog production were in the form of bricks their expansions were measured; it was found that this mix of kyanite flotation concentrate with 4 per cent. talc and 2 per cent. bentonite, fired at 1,650 deg. to 1,700 deg. C. would retain the same dimensions as the original pressed shape. This would make possible a kyanite brick of very high kyanite content and excellent heat-shock characteristics if porosity could be kept low enough. Pressures of 10,000 lb. per sq. in. (on a 4-in. column) were adequate to keep ultimate porosity below 20 per cent. Whereas, the original objective was to prepare grog of high kyanite content, the ultimate result was brick of high kyanite content with satisfactory porosity and spalling resistance, which was produced, without change in volume, at one firing. Only with kyanite fines of the size of flotation concentrate is this possible.

Completely revised and enlarged, the 1938 edition of Pit and Quarry Handbook and Directory will be ready early in February. Producers should apply for their copies at an early date.

THE TREND IN FEDERAL LEGISLATION*

By ABRAM F. MYERS

THE scope of my subject has been greatly enlarged and my task made more difficult by certain momentous decisions of the Supreme Court. By those decisions concepts of constitutional limitations and states' rights, which had survived 148 years of controversy and the Civil War, were swept away. The powers of the Congress have been expanded by interpretation to embrace the regulation of matters heretofore regarded as within the exclusive province of the states. The right freely to contract in respect of terms and conditions of employment has been abridged in deference to exertions of the police power which had previously been condemned by the Supreme Court itself. And legislators, whose pet projects have been side-tracked because of their doubtful constitutionality, are studying Chief Justice Hughes' opinions with an anticipatory gleam in their eyes.

The situation in which we now find ourselves illustrates the desirability of expanding or contracting governmental powers by constitutional amendment rather than by interpretation. More than a year ago the Supreme Court rendered decisions which were diametrically opposed to the ones recently handed down. Those decisions were based on precedents and proceeded on the theory that the law then was as the court declared it to be. In the recent decisions the court cites a wealth of precedents calculated to show a preëxisting judicial sanction for the revolutionary conclusions arrived at. Nothing is more mystifying to laymen than the judicial postulate that the law is fixed and unchangeable when so obviously it is in a state of flux. While this process of evolution or revolution has proved satisfactory in the development of many branches of the law, it is a doubtful expedient for meeting demands for fundamental changes in our governmental structure. The judicial process limits decisions to the facts of the particular cases dealt with and courts can not lay down broad rules of general application. Consequently the enunciation of a new doctrine necessarily engenders great uncertainty as to where the line will be drawn, and these mists can not be dispelled until a wide variety of cases have been brought forward for determination. Even the recent sweeping decisions of the Supreme Court leave the closest students in a maze of doubt as to whether industries and persons whose situations are not identical with those of the industries and persons then before the court come within the scope of those decisions.

We will, therefore, be warranted in devoting a few minutes to the consideration of these decisions, first, because an adequate appreciation of the enlarged sphere of Federal influence is essential to an understanding of the discussion which follows, and, second, because the laws involved in those decisions are themselves indicative of the legislative trend. The Wagner act cases[1] hold that the Congress may regulate the relationship of employer and employee in a factory which derives its raw materials from other states, refines, fabricates or assembles (*i.e.*, manufactures) them and sells the finished products in interstate commerce. Thus, there has been evolved a theory of a continuing current of interstate commerce from the production of the raw materials through the factory to the purchaser or consumer. Heretofore it was supposed that, while the buying, selling and transportation of goods in such commerce were subject to Federal regulation, the processes of production were a part of the domestic economy of the states, immune from Federal control. Now it would seem that the processes of manufacture, although conducted wholly within a state, are not to be regarded as something separate and apart from the interstate transportation which precedes and follows them, but rather as a "milling in transit", a temporary interruption in a continuous interstate movement.

In four of the five decided cases under the Wagner act, all three of the facts mentioned—(1) the gathering of raw materials in interstate commerce, (2) the manufacturing thereof, and (3) the sale in interstate commerce—were present[2] and these facts were stressed in the opinions. It is interesting to speculate what effect the absence of any one or more of these facts might have upon the applicability of the act to a particular business. For example, what is the situation of a concern which supplies its own raw materials and merely refines them and sells the refined product in interstate commerce? This category embraces the entire mining industry and—of special interest to you—the lime industry as well. The element of buying or transporting raw materials in interstate commerce is missing in such cases, but the evil effects of strikes and other forms of industrial strife upon interstate commerce in the products are equally great. I find no support in the opinion for concluding that the Wagner act does not apply to a concern which supplies its own raw materials so long as the products are sold in substantial volume across state lines.

Quite clearly the absence of the second factor—manufacture—has no bearing on the situation. There is even greater reason for saying that a concern which buys and sells commodities in interstate commerce, without doing anything to change their physical condition, is subject to the act. This would embrace wholesalers, jobbers, etc., buying and selling in interstate commerce. Influenced more by personal predilection than strict logic, I doubt whether the Wagner act will be held to apply to the retail trade. The new order has come about too suddenly and I am not yet sufficiently oriented to envision Uncle Sam bossing the corner grocery store. But if any business men to-day derive satisfaction in counting themselves out of the Wagner act, their contentment is likely to be short-lived, as it is probable that many of the states will now enact similar statutes applicable to purely local employments. And it is within the range of possibility that an enlarged Supreme Court may go even farther in extending the Federal jurisdiction or that the administration may seek voluntary adherence to the standards of the Wagner act on the part of the employers not now subject thereto by means of a new N.R.A.

In view of the imminence of the problem to all business men, let us review very briefly the provisions of the act, the true title of which is, National Labor Relations Act. It pro-

* Presented at 19th Annual Convention, National Lime Assn.

[1] Nos. 419-423, 469, decided April 12, 1937.

[2] The fifth case involved an interstate bus line the entire business of which was interstate.

vides that "employees shall have the right of self-organization, to bargain collectively through representatives of their own choosing, and to engage in concerted activities for the purpose of collective bargaining or other mutual aid or protection". It then declares that it shall be an unfair labor practice for an employer: (1) to "interfere with, restrain or coerce employees in the exercise of" the foregoing rights, said to be "guaranteed" by the act; (2) to "dominate or interfere with the formation of any labor organization or to contribute financial or other support to it"; (3) to "encourage or discourage membership in any labor organization", "by discrimination in regard to hire or tenure of employment or any term or condition of employment"; (4) to "discharge or otherwise discriminate against an employee because he has filed charges or given testimony under" this act; (5) to "refuse to bargain collectively with the representatives of his employees." Representatives chosen by a majority of the employees in "a unit appropriate for such purposes" shall be the exclusive representatives of all the employees in such unit for bargaining purposes, although individual employees or groups of employees may present grievances to their employer. The right to strike is expressly reserved to the employees. The National Labor Relations Board is authorized to administer the act, to hear complaints, and to issue orders. As an indication of the sweeping authority vested in this board, the orders upheld by the Supreme Court in the recent cases required the re-employment of discharged employees and the payment of accumulated wages.

So much for the provisions of the act. It is equally important to reflect on what it does not require. As pointed out by Chief Justice Hughes, "The act does not compel agreements between employers and employees. It does not compel any agreements whatever. It does not prevent the employer 'from refusing to make a collective contract and hiring individuals on whatever terms' the employer 'may by unilateral action determine' . . . The theory of the act is that free opportunity for negotiation with accredited representatives is likely to promote industrial peace and may bring about the adjustments and agreements which the act in itself does not attempt to compel . . . The act does not interfere with the normal exercise of the right of the employer to select its employees or to discharge them. The employer may not, under cover of that right, intimidate or coerce its employees with respect to their self-organization and representation, and, on the other hand, the [National Labor Relations] board is not entitled to make its authority a pretext for interference with the right of discharge when that right is exercised for other purposes than such intimidation and coercion. The true purpose is the subject of investigation with full opportunity to show the facts. It would seem that when employers freely recognize the right of their employees to their own organizations and their unrestricted right of representation there will be much less occasion for controversy in respect to the free and appropriate exercise of the right of selection and discharge."

The Women's Minimum Wage Case[3] is of less immediate concern to your industry, but the decision merits attention as it also is indicative of a trend. It sustained as a proper exercise of the police power of the State of Washington, and not violative of the Fourteenth Amendment of the Constitution, a statute providing for a method of formulating, promulgating and enforcing minimum-wage scales for women employed in that state. Many years prior to this decision the Supreme Court held invalid under the Fifth Amendment a similar law enacted by the Congress to provide minimum wages for women employed in the District of Columbia. Since the Fourteenth Amendment imposes on the states the same limitations which the Fifth Amendment places on the Congress, the recent decision required that the former decision be overruled. It follows that the Congress and the states, legislating within their respective jurisdictions, are competent to enact minimum-wage laws which must be observed in the employment of women, even though those employed are of legal age to contract in their own right and are sound in mind and body. The decision took account of the facts that women (1) "are in the class receiving the least pay"; (2) "that their bargaining power is relatively weak"; (3) "and that they are the ready victims of those who would take advantage of their necessitous circumstances". The decision concerns only women, but certain passages lead me to wonder if similar legislation applicable to other "exploited" classes might not be sustained. No gender is specified in the generalizations of the chief justice regarding the power of the state to insure that, in the matter of wages, "bare cost of living must be met", because "what these workers lose in wages the taxpayers must pay", "the community is not bound to provide what is in effect a subsidy for unconscionable employers", and hence "the community may direct its law-making power to correct the abuse". However, as we shall later point out, there is still one more river to cross, or, rather, one more precedent to smash, before this can be brought about.

Already proposals are being discussed for utilizing to the utmost the new and enlarged powers of the Congress. Revival of the 30-hr. week bill was among the first suggestions to be put forth. And the President has been quoted as saying, anent the decision in the minimum-wage case, that minimum wages for women are not enough and that similar protection must be extended to men. As this speech is being prepared it is generally known that bills are being drafted in Administration circles embodying some of or all these proposals. The pro-labor elements being uppermost in the Congress, it is a foregone conclusion that any legislation beneficial to labor and not frowned upon by the Administration will be passed. The recent flurry over the sit-down strikes afforded ample proof of the strength of the labor *bloc*. However sympathetic one may be with the aspirations of labor, there should be no division of opinion regarding the seizure of property and withholding it from the rightful owners in defiance of lawful orders of the courts. Yet the Senate voted down an amendment to the new Guffey Act condemning sit-down strikes and adopted a resolution on the subject only after there had been included therein an equally vigorous denunciation of unfair tactics allegedly used by certain employers. The criticisms of the Supreme Court issuing from these sources, even after the decisions herein dealt with, indicate that they are determined that the Federal authority shall be extended to all workers in the factories and in the fields, on the railroads and on the ships at sea, and even to those in the darkest subterranean passages of the deepest mines.

It is fair to say that the way has not yet been cleared for so comprehensive a program. Unless or until the membership of the court is changed, or the ruling in the Carter Coal Case[4] is overruled by the present court, or clarifying amendments are

[3] No. 293, decided March 29, 1937.

[4] 56 S. Ct. 950.

adopted, there will be serious doubt as to whether legislation (1) affecting the wages of adult male workers, or (2) relating to employments not including all three of the elements hereinabove noted, will be sustained. That case involved the first Guffey coal law, an extraordinary piece of legislation. Briefly stated it imposed an excise tax of 15 per cent. on the sale price of bituminous coal at the mines and then provided for a drawback or refund of 90 per cent. of the amount of such tax to all producers who had filed with the National Bituminous Coal Commission their acceptance of the coal code provided for in the act. The code was to be formulated by the said commission and was to provide, among other things, for the observance of minimum prices for coal, for labor provisions resembling those embodied in the Wagner act, and for minimum-wage scales negotiated and agreed to under the principle of collective bargaining. The Supreme Court held that the so-called tax was actually a penalty in aid of enforcement of the act and that since the labor provisions bore upon the production of coal within the states rather than upon interstate transactions in coal, the so-called tax must fall; further, that since the marketing provisions were inseparable from the labor provisions, they also must fall. Thus the entire act was declared to be unconstitutional without passing upon the legality of the marketing provisions standing alone. Just recently the Congress has passed a new Guffey act providing for a code of fair trade practices including minimum and maximum prices, enforced by a 19½-per cent. tax on all coal sold in violation of the code, but without labor provisions except as declarations of policy. The act, however, was strongly supported by organized labor represented by the influential United Mine Workers of America.

The court did not undertake in the Wagner act to overrule or to distinguish the Guffey law decision beyond saying that that statute was invalid on several grounds—that there was an improper delegation of power, etc.—which does not reconcile the obvious conflict between the two decisions. As a result there is still a fly in the zealots' ointment. It is probable that future court battles over the validity of labor legislation will not involve so much fine-spun arguments as to what is and what is not interstate commerce, and who are and who are not engaged therein, as whether the activities to be regulated or the abuses to be remedied substantially affect such commerce. In the Wagner case the court accepted the view stated in the preamble of the act, that strikes and other disturbances resulting from the refusal of employers to recognize the right of workers to bargain collectively, as well as discriminations practiced against workers for union activities, threaten to and often do burden and impede interstate trade and commerce. "The Congressional authority to protect interstate commerce from burdens and obstructions", said the chief justice, "is not limited to transactions which can be deemed to be an essential part of a 'flow' of interstate and foreign commerce. Burdens and obstructions may be due to injurious action springing from other sources." Assuming that this is the test which will govern future litigations involving the validity of acts of the Congress, can it not be urged with equal reason that the failure of employers to pay living wages, or to shorten excessive working hours, or to afford a safe place to work, also threatens and often results in the same dire consequences? Pandora's box has been opened and the end is not in sight.

Turning to the prospects for legislation designed to be of direct benefit to the business interests of the country, there seems little likelihood that any such measures will be enacted at the current sessions. Indeed the only general laws which could be so characterized during the past four years really had as their primary object the reduction of unemployment and amelioration of the conditions of labor. One of the principal tenets of the "New Deal" is that the government has so long discriminated in favor of industry at the expense of the farmers and laborers that special legislation beneficial to the latter is necessary to bring about a proper balance in the national economy. It is entirely outside the purview of this address to deal with mooted questions of politics, economics and sociology. Moreover, it is much too early to evaluate correctly much of the recent and prospective legislation. For example, the A.A.A., despite much criticism, alleviated a dangerous unrest among the farmers and probably spared the nation a complete collapse in agriculture. The Securities and Exchange Commission Act, designed to eliminate fraud in the sale of securities, may prove in the long run to be highly beneficial to substantial business interests by allaying public suspicion and distrust, enhancing credit and reducing unfair competition. And if labor organizations can be induced or required to assume responsibility for the carrying out of their agreements and the unlawful acts of their members in return for their new-found privileges, it may transpire that existing and prospective labor legislation will make for an industrial peace which will rebound to the benefit of all interests alike. Those of use who have had experience with collective bargaining as practiced by some of the older, well-managed craft unions, know that it can provide a degree of stability and confidence that is highly satisfactory from the standpoint of the employers. In any case fundamental changes in industrial relations and business methods are in store for many industries and it is best they should accustom themselves to the new order.

It is unfortunate that at this writing so little of the Administration's legislative program has been revealed. Apparently the unemployment and farm relief programs are being withheld pending the outcome of the struggle over the Supreme Court reorganization plan. Only a few minor measures of interest to this group are actually being considered on Capitol Hill. One of these is Senate Bill No. 1077 to amend the Federal Trade Commission Act. The principal change to be effected by this bill is to give the commission authority to prevent the use of "unfair or deceptive acts and practices" as well as "unfair methods of competition" in interstate commerce. While "unfair or deceptive acts or practices" are largely comprehended in the existing prohibition against "unfair methods of competition", the new language is made necessary by the ruling of the Supreme Court in the Raladam case[5], that one of the facts necessary to support the jurisdiction of the commission in any case is the existence of competition. This imposed upon the commission the burden in every case involving fraudulent and deceptive practices of showing that competitors, legitimate or otherwise, of the concern engaging in such practices were injured thereby. It is evident that this bill, which has already been passed by the Senate, will greatly strengthen the commission in its efforts to protect honest business and the public against fraudulent enterprises which now enjoy immunity under the law. The bill also will establish beyond controversy the power of the Federal Trade Commission to institute economic investigations "upon its own initiative", a point that has been sharply contested both in the commission and in the Congress. The

[5] 283 U. S. 643.

Economic Division, pursuant to direction of the commission, has conducted constructive investigations in reference to resale price maintenance and basing points; and if the commission exercises its powers in the future as wisely as it has in the past, legitimate business will have nothing to fear from its activities in this connection.

Most business men and all trade-association executives are anxious to learn whether prospective legislation relating to minimum wages, maximum working hours, etc., will include or be supplemented by provisions for coöperative machinery to stabilize markets, eliminate wasteful competitive practices, and otherwise assist industry to sustain the additional burdens which may be imposed upon it. The N.R.A., in the beginning, was in the nature of a compact between the government and industry, whereby industry assumed the burden of the labor provisions of the act upon assurances freely given that the government would encourage and protect it in constructive coöperative endeavors. But the N.R.A. sought to cover too much ground, the problems of administration proved to be insuperable, and the Blue Eagle was doomed before the Supreme Court brought it to earth. Those of us who had advocated the principles of industrial coöperation under the governmental auspices long before the N.R.A. came into being, while glad to be relieved of a burdensome administration which was fast disrupting the industries that we served, were nevertheless saddened by the failure of an undertaking in which we placed so much hope. I believe that the proponderance of opinion in industrial circles favors the establishment of some method whereby the competitive problems of industry can be worked out coöperatively under the watchful eye of the Federal government and without undue interference on the part of inexperienced and opinionated bureaucrats. The tragedy of the N.R.A. was its maladministration.

Possibly the only hint as to what is in store in this connection is to be gleaned from the recommendations of Major George L. Berry's Council for Industrial Progress. The extent to which this movement enjoys the support of the Administration has been shrouded in mystery. Speculation on this point, rife on the eve of the December [1936] meeting, undoubtedly tended to discourage attendance by the responsible heads of industry. However, the membership list of the council contains the names of many prominent trade-association executives (probably without authority to bind their industries), as well as leaders in the field of organized labor, from whose ranks Major Berry sprang. The recommendations of the council, together with draft bills embodying them, have been submitted to the President. Chief among these recommendations are: (1) the establishment of schedules of maximum working hours and minimum wages for each of the several industries and trades and the abolition of child labor; (2) establishment of enforceable rules for outlawing unfair methods of competition; (3) amendment of the anti-trust laws to permit, without jeopardy, coöperative action to maintain fair methods of competition; (4) establishment of a National Economic Council to conduct economic studies; (5) establishment of a system of government insurance of commercial loans to small enterprises; and (6) authorization of a complete national census of unemployment every five years, supplemented by periodical between-census checks, to give a "running inventory of employment and unemployment".

The report of the Committee on Fair Trade Practices adopted by the Council in March, 1936, reflects a reaction from the grandiose schemes of the N.R.A. and harks back to the Nye bills of 1932. That is to say, the committee recommends that provision be made for enforcing the so-called Group II Rules when adopted by a substantial majority in an industry and approved by the Federal Trade Commission. The provisions specifically recommended for inclusion in the category of enforceable rules were, for the most part, the routine rules of the trade-practice-conference procedure, such as prohibitions of sales below cost "when made for the purpose or with the effect of injuring a competitor or misleading the public"; the employment of loss-leaders for a similar purpose; circulation of false or misleading information; defamation of competitors; including breach of contract; misbranding, etc. The suggestions relative to price discrimination, granting of rebates, etc., have been merged in the Robinson-Patman Act. The only proposal not of a routine nature was that open-price reporting be permitted and sponsored by the government, "with the understanding that no such plan shall be used as a device or cloak for price-fixing". The report contained no information or suggestions relative to the details for ascertaining "cost" or enforcing a provision against selling below cost; or as to the nature of the safeguards to be erected against price-fixing.

These timid proposals and the confusion which would result from their adoption emphasize the need for constructive thought and deliberate action in amending the anti-trust laws. It is by no means clear that our organic law would sanction any provision to empower the majority in an industry to legislate for the minority in the matter of fair trade practices. Existing conditions are greatly to be preferred to another period of experimentation and confusion ending in futility. Of the unfair practices specified in the recommendations, only one can now be regarded as of any real importance. It would be a relief to business men and their lawyers if the Congress or the courts would clear up the prevailing uncertainty in reference to open-price reporting. As matters now stand, the practice has been upheld in only one case—that involving the Sugar Institute[6]—and there the Supreme Court emphasized two peculiarities of the sugar business: the standardized nature of the product and the preëxisting custom of selling pursuant to publicly-announced prices on "moves". While it would seem that any attempt to distinguish between an industry where price publication has been a matter of custom and one where it grew directly out of an industry agreement would be unsound, nevertheless adoption of the practice by the latter method involves elements of risk which many industries are unwilling to incur. And assuming that such a policy can be lawfully instituted, it still must be carried on without any agreement express or implied among the members participating therein that the prices openly announced shall be adhered to in any and all transactions. Up to this point the ruling in the Sugar Institute case is a little like the permission given by the lady in the familiar couplet to her daughter who wanted to go swimming. But the situation is even more complicated since the enactment of the Robinson-Patman law, under which any departure from published prices would constitute *prima facie* evidence of unlawful price discrimination. Thus we have arrived at the happy state of affairs where an industry employing the open-price policy must tread softly lest the Federal Trade Commission prosecute it for too rigid an adherence to published prices, on the one hand, or for too lax an adherence thereto, on the other hand. If any of my listeners think

[6] 56 S. Ct. 629.

this is far-fetched, let them compare the complaints recently issued by the commission under the Robinson-Patman Act for alleged price discrimination with those issued under Sec. 5 of the Federal Trade Commission Act charging price-fixing growing out of the N.R.A. Code procedure.

We will not be warranted in exploring further into these recommendations and their possibilities for good or evil. There is little likelihood that they will be adopted by the present Congress.[7] Indeed that hardy perennial, the bill to permit resale price-fixing on trade-marked articles, has been tabooed by the White House. Cracking down on this measure the President said: "The present hazard of undue advances in prices, with a resultant rise in the cost of living, makes it most untimely to legalize any competitive or marketing practice calculated to facilitate increases in the cost of numerous and important articles which American householders, and consumers generally, buy." Coincident with the sending of this message, the President approved the new Guffey act, which definitely legalizes competitive practices calculated to increase the cost of coal. Coal, however, is a special case and there doubtless are other industries where prevailing intolerable conditions call for special treatment. But it is not regrettable that there may be some delay in the enactment of general "trade-practice" legislation. The business interests now have no definite program supported by a clear-cut majority of those who would be affected by it. Their councils are a confusion of tongues. And the Congress is not qualified to legislate on this delicate and important subject without adequate research and information. This brings me to a proposal which I have advanced in the past which I suppose will continue to fall on deaf ears; nevertheless, at the risk of being consistent at a time when inconsistency is rated a virtue, I quote from a paper read at a symposium held at the Law School of Columbia University in 1931: "I propose legislation for another Industrial Commission, similar to the Industrial Commission which led to the creation of the Bureau of Corporations, and the Monetary Commission which paved the way for the Federal Reserve Act, to consist of representatives of both Houses of the Congress and distinguished lawyers, economists and business men, to make a thorough study of the trust problem and report on a program which will command confidence and which can be enacted with the minimum tinkering on the floor." . . .

It has been demonstrated that Treasury estimates of prospective revenue were unduly optimistic and that your Uncle Samuel is deeper in the red than ever. The situation calls for additional taxes or for retrenchment; possibly for both. The Administration, for the first time since 1933, is advocating economy and the President's message met with a favorable reception from all save the most radical elements in the Congress. It is now proposed to go the President one better and provide for a flat reduction of 10 per cent. in all governmental expenditures. This latter proposal will encounter rough going but if it is achieved only in part we may escape the paralyzing effects of additional taxes levied on enterprise. There is, however, a reform in our taxing policy which should be made irrespective of the need for additional revenue or the amount that would be produced thereby. The income-tax base should be broadened so as to include in the lower brackets a much larger percentage of our population. Every person who enjoys a livelihood, no matter how meager, should make a direct contribution to the Federal Treasury, even though the amount paid barely covers the cost of collecting it. All citizens now pay heavily in the form of indirect taxes, but the payment of a direct tax would create a sense of responsibility and induce sober thinking on the part of a vast number who to-day think of the Federal Treasury only in terms of a game of "put and take"—they take while others put. And before I leave this general subject it will not be amiss to remind you that throughout this period of reconstruction and high finance, industry has been mercifully spared one blight which might have been visited upon it. No general revision of the tariff has been attempted and there is no indication that any such unsettling experience is in store. And the Council for Industrial Cooperation has included a plea for adequate tariff protection in its recommendations to the President. . . .

Because each situation is controlled or at least affected by its peculiar facts, it would be dangerous to risk the generalizations inherent in any academic discussion as to what the Robinson-Patman Act permits and what it forbids. I believe, however, that I can fairly treat of the question that has been raised as to the part which your trade association should play in policing the industry to secure obedience to the act. In the first place let me say that the act (by reference to the Clayton Act) provides for proceedings by the Federal Trade Commission, for civil and criminal prosecutions by the Federal district attorneys, and for private suits for treble damages. Nowhere in the act is there any suggestion that private parties have any right to supplant or supplement public agencies in enforcing the statute; and there is no precedent for any attempt by trade associations or other private agencies to perform any such function. The authority attempted to be delegated to the code authorities under the N.R.A. constitutes no exception to this rule, since there the authority sprang from a public source and was attempted to be delegated to quasi-public agencies; and if anything further is needed to destroy the precedent, you need only recall that the entire undertaking was unconstitutional.

Moreover, let me remind you that the Robinson-Patman Act was intended as a restriction upon and not an enlargement of the rights of industry. It was not intended to be and must not be regarded as an instrument for compelling observance by your competitors of their publicly-announced prices. Obviously the best way to comply with the act, and the best method of rebutting any charge that you have violated it, is to publish prices and terms of sale and to adhere to them in all transactions. But any unusual activity on the part of your association to secure compliance with the statute would almost certainly be construed as a concerted effort to secure adherence to published prices and this, we have seen, is not permissible under the decision in the Sugar Institute case. The law ought not to put you in a situation where you "will be damned if you do and damned if you don't"; but we must conform to the situation as we find it, and try to keep out of trouble until the law has been changed or satisfactory interpretations have been made. Pricing policies and adherence to prices must be by individual action and wholly voluntary, and no coöperative activities should be engaged in which might give rise to an inference or suspicion that such policies are the result of collusion or coercion. However, there is no reason why instances of seeming violation of the act should not be submitted to industry counsel for advice as to whether a complaint to public authority or the institution of a private action is warranted. And, if a condition of aggravated non-compliance with the law threatens to inflict injury upon the entire industry or a

[7] [The last Congress.—*Ed.*]

substantial portion thereof, there is no reason why the association should not act for the industry in presenting the facts to the Federal Trade Commission or the Department of Justice. Coöperation with public authority in such matters should negative any inference of collusive action or ulterior motive.

In barest outline I have attempted to present those aspects of the situation in Washington which should be of interest to you as business men and trade-association members. Perhaps my remarks may have seemed to place limitations on the future usefulness of such organizations. That is because I have dwelt a good deal on those activities which became familiar to us under the N.R.A. I seriously doubt whether the administration of codes of fair competition will play an especially important part in trade-association activity during the next few years. Business men, with the guidance of counsel, will have to feel their way in the existing unsettled state of the law. However, I think the opportunities for constructive service, while differing in kind, have been greatly enlarged and that you will find your association playing an even more important and comforting rôle in the years which lie ahead. The Federal government is to be expanded at the expense of the states, the solution of many of your every-day problems will no longer be found in the four walls of your plant, and you will have need to make frequent pilgrimages to Mecca, which is on the banks of the Potomac. In the future, whenever an employer discharges an employee, the former will contend that it was for inefficiency and neglect of duty, the latter that it was because of his union activities, and the case will go to the National Labor Relations Board. Whenever an employee feels that there is too little in his pay envelope, or that the shop manager has given him a long count in the matter of working hours, the prospects are that the controversy will go to the Department of Labor or other designated Federal agency. And if one of your customers feels that you are giving one of his rivals a better price than you are offering him, you may be hailed before the Federal Trade Commission. In the solution of these new and troublesome problems, in the formulation of plans for the future, in the promotional work which is so necessary to repulse the invasion of substitute products, and in a hundred other ways you will require the guidance and assistance which only a well-organized, efficiently conducted trade association can supply.

Effects of Hydration of Properties of Lime

The effects of conditions of hydration and prior burning on the properties of lime hydrate have been the subject of recent study by the U. S. Bureau of Mines. Both high-calcium and dolomitic limes were carefully burned and then hydrated in a special apparatus designed for close control of the quantity of water added and the temperature of hydration (by water cooling). The various hydrates were tested for settling rates, putty volumes, and plasticity index (Emley plasticimeter.)

The most important variables discovered were temperature of hydration and degree of hydration of the magnesia in the hydrated product. The better the hydration of the magnesia, the higher the plasticity index. Dolomites that at present do not yield finishing limes could be made to do so by controlling conditions during hydration. — *1937 Annual Report, Non-Metals Division, U. S. Bureau of Mines.*

Blasting Report Issued

Earth Vibrations Caused by Quarry Blasting—Progress Report No. 1, covering the field work done last year on this subject by the U. S. Bureau of Mines has been released in mimeographed form by the Bureau. The report contains 73 pages.

THE "TYPICAL" U.S. MOTORIST

TYPICAL MOTORIST EARNS $25 TO $30 PER WEEK =
1.
OWNS CAR VALUED AT $200.00
2.
$30
HELP!
GAS
TAX COLLECTOR
PAYS $30.00 GASOLINE TAXES
20.00 OTHER AUTOMOTIVE "
$50.00 ANNUALLY
3.
FOR THE NEXT 10 DAYS, YOU'RE WORKIN' FOR ME ONLY! COME ON, STEP ON IT =
TAX COLLECTOR
RIDES 40 - 8 HOUR DAYS
WORKS 10 - 8 " "
TO PAY HIS AUTO TAXES!!
4.
3 OUT OF 5 MOTORISTS NEVER BOUGHT A NEW CAR =
5.
$1.00 OUT OF $6.00 HE PAYS DIVERTED FROM ROADS!
DETOUR
6.

The above cartoon has been prepared and is being circulated by the American Petroleum Industries Committee to build up sentiment against the diversion of gasoline-tax and license-fee moneys. The committee also points out that gasoline and other automotive taxes account for approximately 12 per cent. of the total taxes collected by the Federal, state, county and other taxing jurisdictions in the entire country.

JOSHUA L. MINER
Vice-President,
Atlas Lumnite Cement Co.

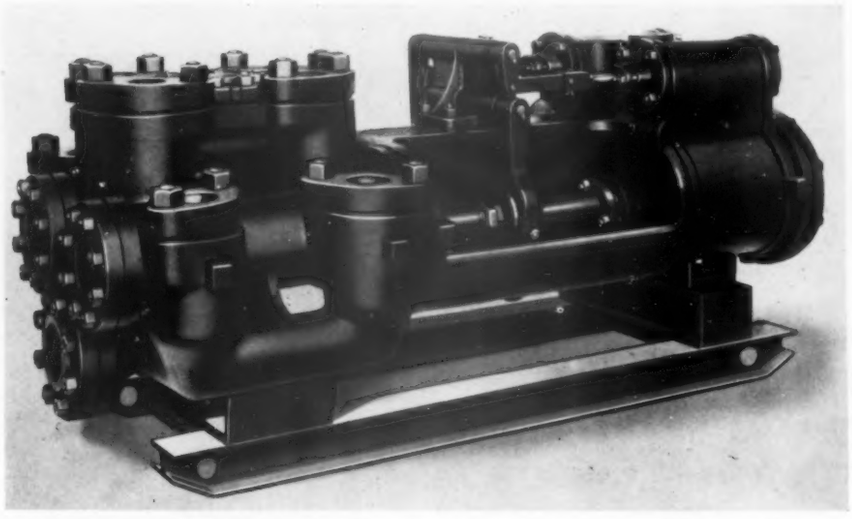
MEN · OF · THE · INDUSTRY

Mr. Miner joined the Atlas Portland Cement Co. (now Universal Atlas Cement Co.) in 1922 and has been identified with the Lumnite concern, a subsidiary, since its formation in 1924. In charge of sales, he went to Europe in 1929 to study similar cements and the following year was made technical director. Last month he was elected vice-president and a director, succeeding the late Major C. R. Hulsart. After graduation from Lafayette College he became a chemist for the Alpha Portland Cement Co., returning to his alma mater in 1907 to take charge of the cement and concrete laboratories. He re-entered the industrial field again in 1910, managing the Dallas and New York offices of the Pittsburgh Testing Laboratory.

1937 Equipment Progress

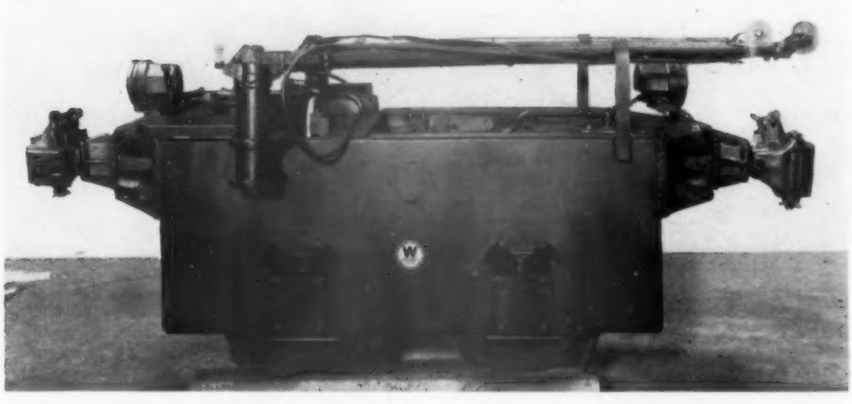
The new 1938 line of excavators introduced by the Marion Steam Shovel Co. ranges in size from 1 1/4 to 2 1/2 cu. yd. Features include self-cleaning non-binding crawlers, large-diameter rotating clutches and independent chain crowd.

Two-piece body renewable-lip dipper, recently introduced, rounds out the Amsco line. Sides and back are a single casting and the front, which is riveted on, can be replaced if necessary.

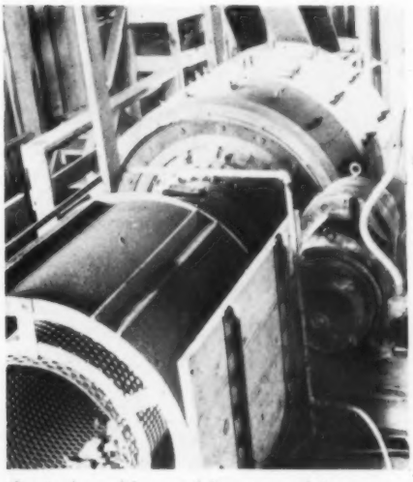


Duplex steam pump with eight-cover side-pot type fluid end and improved piston-valve steam end. Sizes are available up to 148 gal. per min. and fluid-end pressures to 1,000 lb. per sq. in. (Fairbanks, Morse & Co., Chicago, Ill.)

Several new models of Crescent drag scrapers were added to the line of Sauerman Bros., Inc., in 1937, so that five main groups are now carried. These are designated as (1) lightweights, (2) heavyweights, (3) mammoths, (4) bulldogs, and (5) coalers.



Electric trolley-type locomotive designed in 1937 by the Westinghouse Elec. & Mfg. Co. for the Riverside Cement Co., Crestmore, Cal. It was built to meet peculiar operating conditions and not adapted for service as a stock model. Other Westinghouse developments of the year included nonmetallic micarta bearings for ball- and rod-mills, various improvements in switch and controller equipment, and totally-inclosed a.-c. motors especially suited to service in the pit-and-quarry industries.

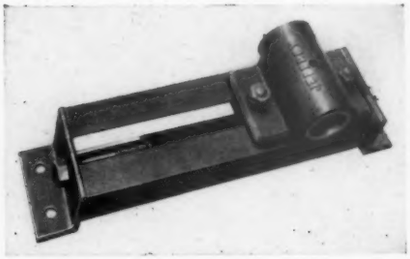


Conical scrubber and heavy revolving screen attached to the motor and main driving gear, shown above, is a new Hardinge development for removing clay and colloidal slimes from various ores. Obtainable in capacities from 200 lb. to 500 tons per hr.

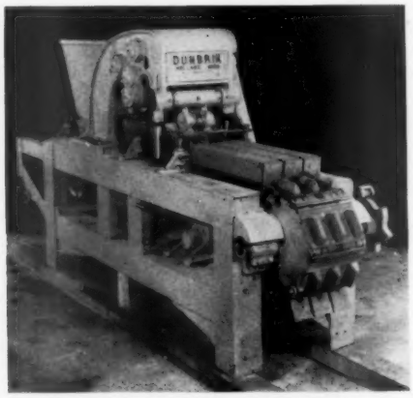
1937 Equipment Progress

The 33-B, a 1¼-cu. yd. convertible excavator was a 1937 development of the Bucyrus-Erie Co., South Milwaukee, Wis. Alloy steels and welded construction have been combined to produce a machine that operates at high speed, has high mobility and ample strength to give steady, dependable service in the heavy digging expected in a machine of this size. A choice of gasoline, Diesel or electric power is offered.

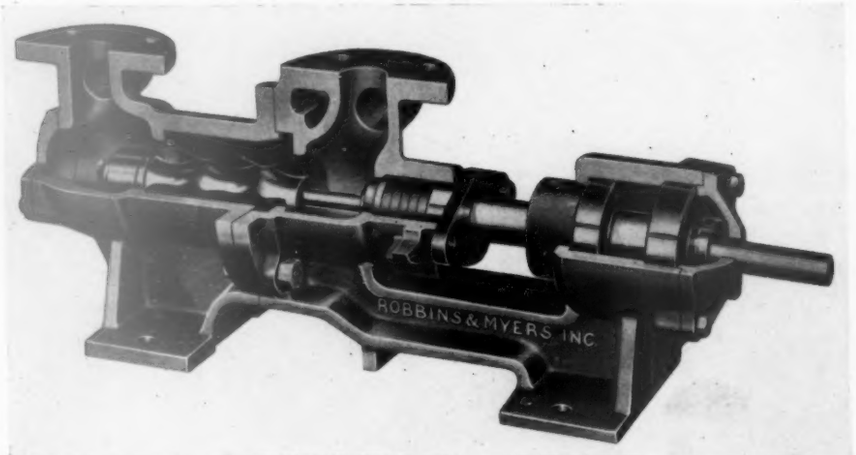
Pictured above is the complete new plant developed last year by the Concrete Equipment Co. of Holland, Mich., for the production of concrete blocks and bricks. Only two men are required to operate the plant to attain a large daily production of the various products. A standard down-face stripper is employed.



The Jeffrey Mfg. Co., Columbus, O., developed the protected-screw take-up for conveyors and elevators, shown above, during last year. The screw is protected from operating strains and shocks and is relieved of all load while in service.



Last spring the W. E. Dunn Mfg. Co., Holland, Mich., announced the above standardized production plant for making Dunbrik. The feature of the machine is its extreme flexibility. Besides making standard size brick it can produce many additional sizes up to a 12-in. by 24-in. unit.

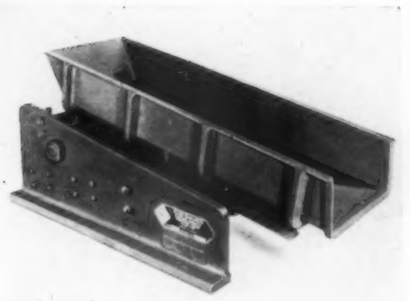


American rights to the Moyno (Maineau) pump were acquired last year by Robbins & Myers, Inc., Springfield, O. The Moyno has all the advantages of the piston-type pump, in that it is self-priming and will operate under high head pressures. It also has many of the advantages of the centrifugal and rotary-type pumps, such as uniformity of flow, minimum turbulence of liquid and other characteristics. The Moyno pump is a valveless, positive displacement machine with a single rotating assembly. The rotor rolls in the stator helix maintaining a sealed surface contact throughout its length, its eccentric rolling motion effecting an advancing positive displacement from one end of the stator to the other.

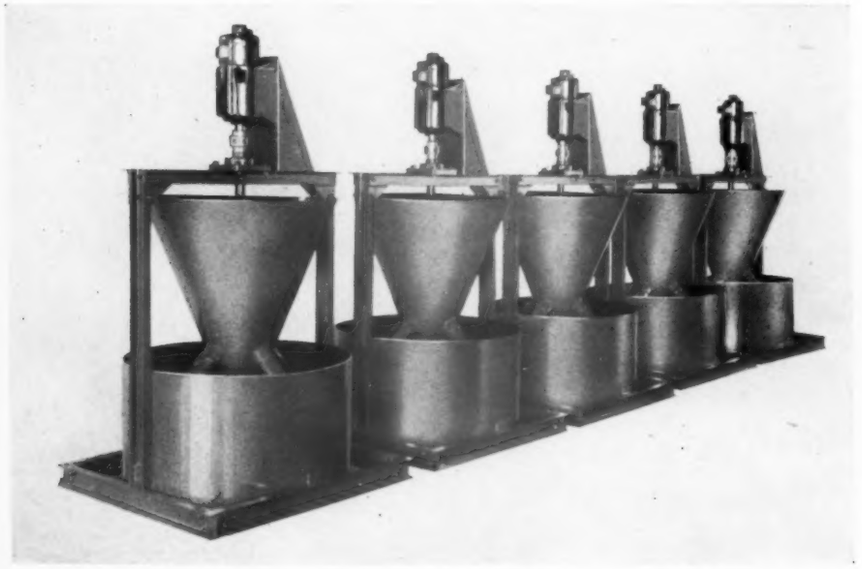
Streamline design, drum mounting which prevents misalignment, and a top charging door which is accessible from a side run-way are features of the advanced line of truck-mixers and agitators developed during the year by the Ransome Concrete Machinery Co., Dunellen, N. J. The frame is an electrically-welded unit with sufficient flexibility to eliminate any tendency to crack when under load. Friction in moving parts is eliminated by use of SKF and Timken roller bearings.

1937 Equipment Progress

Kennedy air-activated containers for bulk cement, shown above being transferred to railway cars, are a notable development of the Kennedy Van Saun Mfg. & Eng. Corp., New York, N. Y. The LCL Corp. is handling the allocation of these containers for all cement being used in erecting the structures for New York's 1939 World's Fair. Other 1937 developments of this company include the supplying of solid grinding rings as an alternative arrangement to panel-type concaves on the Kennedy gearless gyratory crusher. Kennedy jaw crushers have been made available with Herculite steel frames, while the Kennedy air-swept tube mill is now available with automatic level controls.

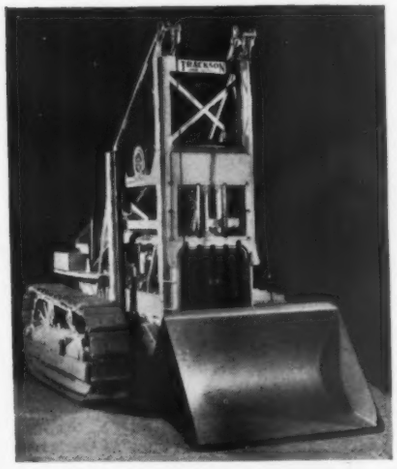


Utah electro-magnetic feeder, a 1937 development of the Allis-Chalmers Mfg. Co., Milwaukee, Wis. It uses standard alternating current, the power unit receiving its energy through a small rectifier. It is supplied either in the suspension type or rubber-mounted on the foundation.



The Deister Concentrator Co., Ft. Wayne, Ind., redesigned its Concenco revolving feed distributor, a battery of five of the machines being shown above. The distributor effects a splitting of the feed, sluiced to the cone portion of the feeder, into any desired number of fractions from 2 to 10, with equal distribution. The five distributors illustrated feed 34 Deister-Overstrom tables at a large phosphate plant in the southeast.

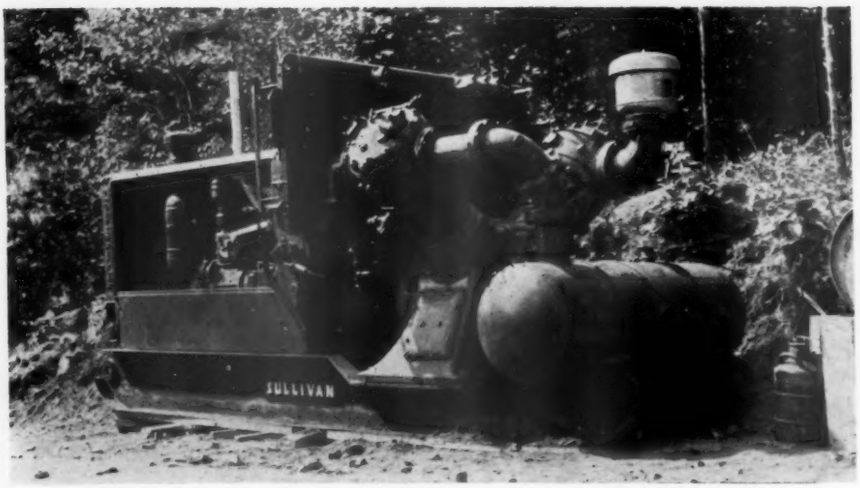
The 1937 Lima Type 650 is a convertible shovel, crane or drag-line. When used as a shovel it is equipped with a 1½-cu. yd. dipper, 21-ft. boom and 17-ft. dipper handle. The shovel boom is of box-type design, electrically welded throughout.



(LEFT)—The Trackson High Shovel is now available on Caterpillar tractors R4 and D4. It is regularly equipped with a ¾-cu. yd. bucket and will dig, move and load up to 50 cu. yd. per hour. Advantages include: a fast mechanical hoist which is not affected by weather temperature; independent front end drive; free dumping of the bucket at any point of the lift; and automatic release when bucket reaches maximum height.

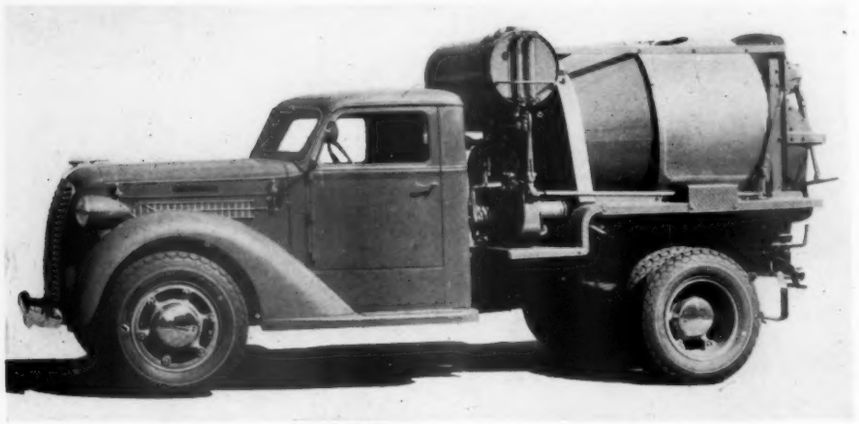
(RIGHT)—The dainty miss in the cab of the Link-Belt Speed-o-Matic shovel adds a touch of interest to the picture and serves to emphasize the modern trend in excavator manufacture toward effortless, finger-tip control which has gone a long way toward relieving operator fatigue.

1937 Equipment Progress



Pictured above is one of a new line of "V" vertical type air-compressors just announced in December of last year by the Sullivan Machinery Co. and known as the WM-102 Series. These compressors are available in three sizes—445, 550 and 720 cu. ft. per min. They can be operated with any type of drive or power unit. Qualities stressed are smooth running balance, maximum power economy, precision construction and the ability to give reliable service over a long period of life.

The American Foundry Equipment Co., Mishawaka, Ind., recently placed on the market an improved dust-collector, a phantom view of which is illustrated above. The equipment is said to be highly efficient for dust recovery and to require the minimum maintenance.



The latest type of Rex Motomixer and Agitator which incorporates the numerous improvements made during 1937 by the Chain Belt Co., Milwaukee, Wis., is illustrated above. Outstanding features of this mixer include the patented Rex cone and drum and the three-point mounting.

One of the outstanding developments of the Buda Co., Harvey, Ill., was this 4-cyl. Diesel engine. This model has a displacement of 196 cu. in. and is especially adaptable to tractors, shovels and other portable equipment. The company also did considerable development work on its line of industrial gasoline engines during the year.

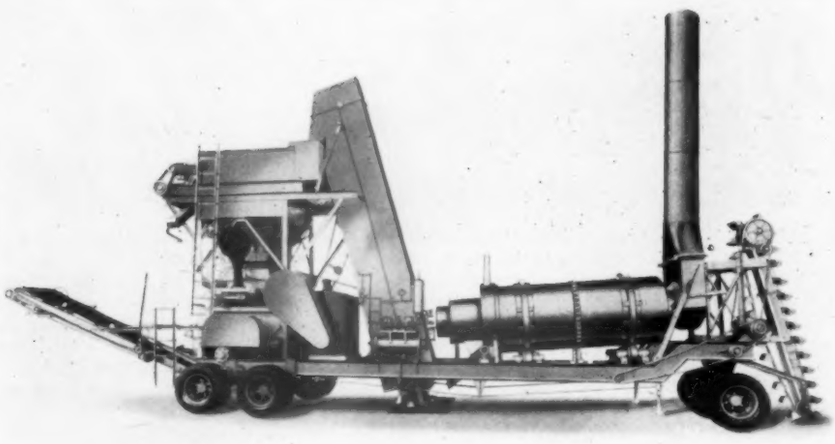
(LEFT)—A new grapple which employs two parallel pairs of tines was introduced early in 1937 by the Owen Bucket Co., Cleveland, O. Each pair of tines operates independently of the other, gripping and lifting the object firmly.

R. G. LeTourneau, Inc., Peoria, Ill., introduced its Type U expanding Carryall scraper during the early months of last year. Two telescoping buckets are employed, one being filled first followed by the second. This expanding bowl capacity is said to increase yardage by 50 per cent.

1937 Equipment Progress

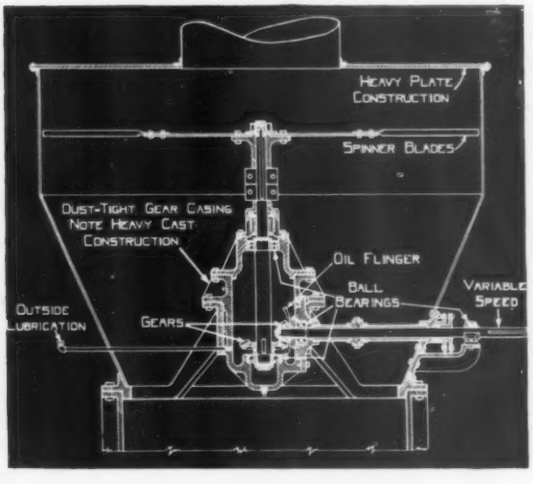
The Crescent joist machine casts ten reinforced-concrete joists of standard I-beam design at one time. This design allows light-weight construction while maintaining maximum strength. Rubber stop blocks are provided for casting fractional sections of any desired length. The same equipment can be used in the production of reinforced-concrete slabs for floors and walls. (R. & L. Concrete Machinery Co., Kendallville, Ind.).

Production of a new tractor was recently announced by the Marmon-Herrington Co., Indianapolis, Ind. The machine utilizes the new B. F. Goodrich type of track with Marmon-Herrington patented suspension, combining the strength of steel with the cushioning effect of rubber.

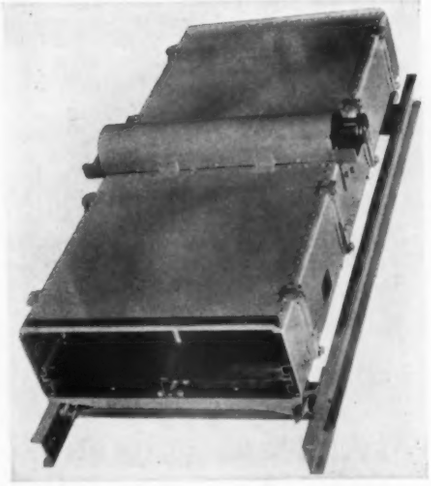


(LEFT)—The Iowa Mfg. Co., Cedar Rapids, Ia., will formally announce at the Road Show a new portable hot-mix asphalt plant which has been named the Cedar Rapids "Speedline." This plant is designed for bituminous construction involving contracts that can not be handled economically by larger hot asphalt plants.

The sketch below shows the new application of "spinner" air-separators to Williams roller mills. It is well suited particularly to handling sticky materials which ordinarily clog the vanes of vane-type separators. (Williams Patent Crusher & Pulv. Co., St. Louis, Mo.).



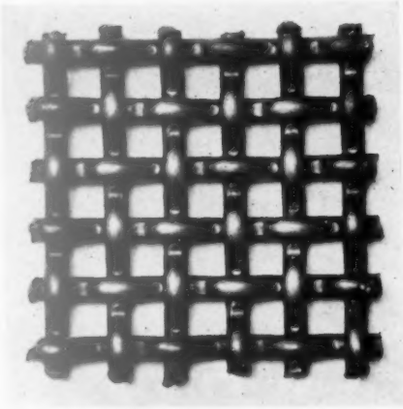
(RIGHT)—Newest in the Bucyrus-Armstrong line of blast-hole drills is the 27-T. The rig weighs 18,400 lb. and has a tool capacity of 2,000 lb. Outstanding features include a new built-in tool wrench, special bumper reel, large operator platform and a fast, snappy action.



Dust-tight, top and bottom inclosures are features of several new vibrating screen models that have been added to the 1938 line produced by the Universal Vibrating Screen Co., Racine, Wis. Hinged top panels are opened easily and quickly. The inclosures are so constructed that the machine operates as quietly as the standard open types.

1937 Equipment Progress

Trailmobile trailer with Galion hoist and dump body. Although not rated at this capacity, it has continually hauled 28,000 lb. per load with Ford tractor power at a considerable economy in fuel, oil, tires, and other operating costs. (Trailer Co. of America)



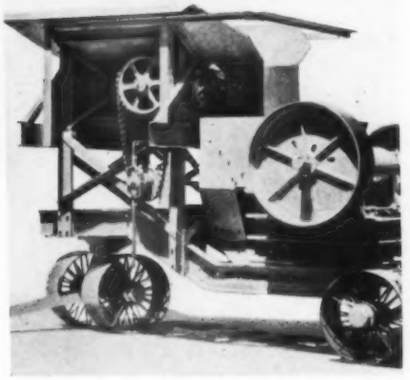
The outstanding features of the screen cloth developed during the year by Harristeel Products Co., New York, N. Y., are unusual tensile strength (around 2,500 lb. per sq. in.) and its high Brinell hardness which is approximately 450. It is said to have unusual resistance to abrasion yet retaining sufficient ductility to withstand normal vibration.

One of the outstanding equipment developments of the year by the Traylor Engineering & Mfg. Co., Allentown, Pa., was the 400-ft. rotary kiln shown above, built for the Chemical Lime Co. Traylor also brought out a line of full-welded, all-steel Blake-type crushers fitted with curved jaw plates, thus applying the original Traylor principle to this type of reduction equipment for the first time. These machines, designated as Type H, are being manufactured in sizes up to 30 in. by 36 in. Another Traylor development during 1937 was the fabrication of jaw-crusher frames. These have been made up both in one piece and sectional, up to 36 in. by 48 in. in size, composed entirely of heavy plate, properly ribbed and welded throughout. Throughout its entire line the company has adopted arc-welding in the manufacture of machinery to a great extent.

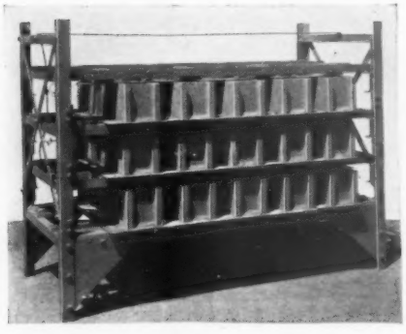
The line of portable belt conveyors manufactured by the George Haiss Mfg. Co., Inc., New York, N. Y., was improved during the year through the employment of self-propelling carriages which enable them to be more easily moved about the plant property. The view at the left shows one of these machines. In connection with the familiar Haiss loader, the most interesting development during the year was the application of Diesel power to this equipment. One of these Diesel-driven machines is pictured above. All models of Haiss loaders have been given a slightly greater discharge height and reach. Transmission gearing and operating clutches are totally enclosed in a dust-proof covering and operate in an oil bath.

1937 Equipment Progress

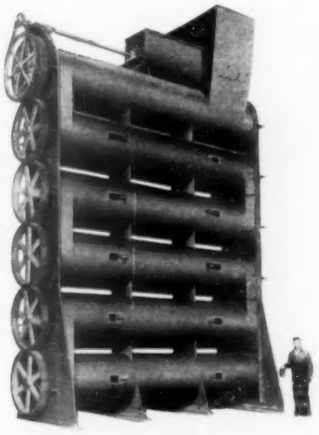
The Model 303 shovel above was a 1937 product of the Koehring Co., Milwaukee, Wis. It is fully convertible, with a 1-cu. yd. rating as a crane or drag-line. Attachment changes are easily and quickly made on the job. Ease of operation is an outstanding advantage. A simple gear shift provides two selective swing speeds to synchronize with the arc of swing and height of lift, for increased output.



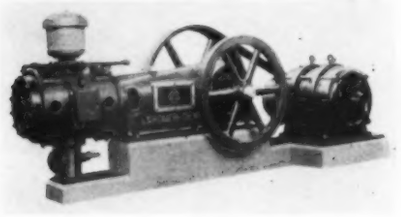
A unique feeder-crusher unit recently developed by the Universal Crusher Co., Cedar Rapids, Ia., for a large stone-crushing operation involves the use of a Universal primary jaw crusher mounted on a portable rig with an apron feeder above it, allowing a steady feed of rock into the crusher.



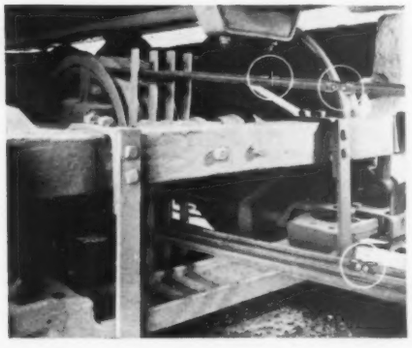
A new design of curing rack for concrete products was developed by the Technical Development Corp., Detroit, Mich., in conjunction with its electro-cure process. When the loaded rack is run into the kiln, electrical connection is made at the outlet plug and the brief curing process starts. The rack is of sturdy construction and convenient to load and unload.



The Kritzer Co., Long Island City, N. Y., is now building the Kritzer hydrator in two sizes, both continuous hydrators of 6-cylinder design with pre-hydrating attachment. These latest hydrators are structurally different from the earlier type, being built of boiler plate which is bolted and welded into a rigid whole.

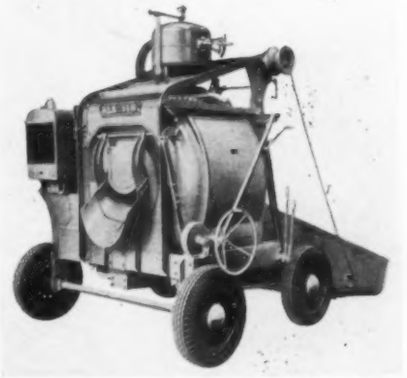


The Gardner-Denver Co. announced an improved single-stage horizontal air-compressor for heavy-duty, full-load service at low power cost. Known as the RX, it has totally-inclosed dust-proof construction without sacrifice of accessibility as well as accurate balance and freedom from vibration.



A new fastener for joining "C" section V-belts of fabric core, cross-weave construction, was announced by the Flexibile Steel Lacing Co. of Chicago. The fastener makes practicable the installation, shortening or replacement of V-belts on the job without delays.

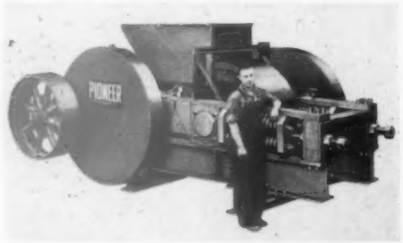
The Harnischfeger Corp., Milwaukee, announced a new P & H Model 855 in its line of "Pacemakers." The first 2-cu. yd. excavator built with all-welded construction of new alloy steels, the 855 claims greater strength and rigidity with less weight. It is fully convertible.



The Chain Belt Co., Milwaukee, Wis., announced a new streamlined 14-S mixer during 1937. New from top to bottom, this machine incorporates faster charging and discharging, lighter and stronger frame, new accurate water control, and increased engine power.

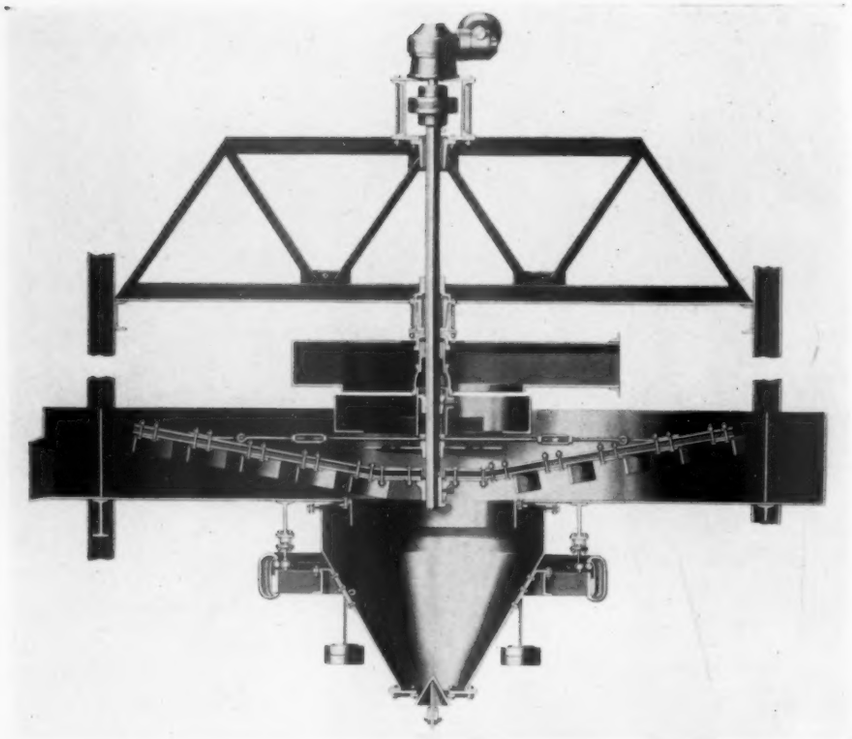
1937 Equipment Progress

A 15-cu. yd. pneumatic-tired "buggy" designed particularly for hauling stone or gravel was announced by R. G. Le Tourneau, Inc., of Peria, Ill., last year. In unloading the body moves backward over the bed, pushing the load through an ever-widening opening to the rear so the wheels do not travel over the material as it is unloaded.

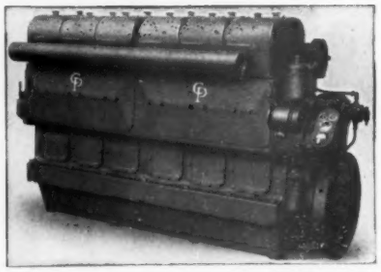


Pioneer Engineering Works, Inc., Minneapolis, Minn., for many years known as the Pioneer Gravel Equipment Mfg. Co., announced a new and larger roll crusher. The rolls are each 54 in. in diameter and 24 in. wide. The crusher employs manganese-steel shells, star gear drive, spring release and inclosed gear drive.

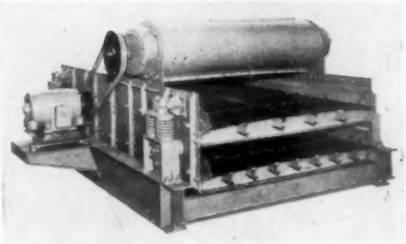
"Feather-touch" control, a cushioned clutch which limits the hoist-rope pull to a definite value, is a feature of a ⅝-cu. yd. shovel brought out during the year by the Northwest Engineering Co., Chicago, Ill. Known as Model 20, it is fully convertible simply by changing the booms.



The Nordberg-Wood auto-vortex bowl classifier was developed by the Nordberg Mfg. Co., Milwaukee, Wis., to meet the demand for a machine to recover very fine sand. This machine has the same conical-shaped hopper carried in a lever mechanism as used for the familiar cone-type machine.



The Chicago Pneumatic Tool Co., New York, N. Y., announced its new Type 8 Diesel engine, in four models. The engine is of the four-cycle, direct-injection type especially designed for medium speed and continuous duty.



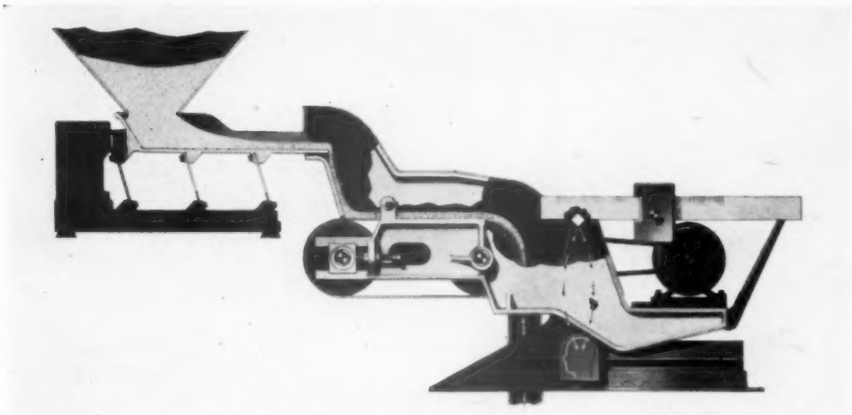
In the Eliptex screen, a 1937 product of the Robins Conveying Belt Co., New York, N. Y., the exceptionally effective screening and feeding action at high capacity is due to the unique elliptical motion, uniform throughout the screening surface. The direction of elliptical motion is counterflow.

Electric-arc welding throughout the entire chassis is a feature the Hug Co., Highland, Ill., stresses for low maintenance cost in the above 1937 dump truck, while operating costs are held to the minimum by the Caterpillar Diesel engine.

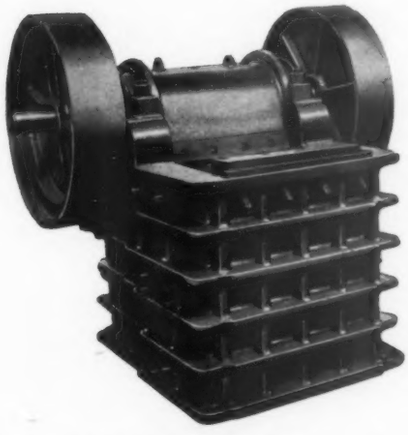
A two-stage built-together pump (pump and motor built together) was developed by Fairbanks, Morse & Co., to operate against heads up to 500 ft.—higher than could be handled by a single-stage unit. In many applications it offers a less expensive alternative for multi-stage and split-case pumps.

1937 Equipment Progress

Two new models, the EM rated at 2,000 lb. gross and the EQ of 2,300 lb. gross, were placed in production last year by Mack Trucks, Inc. They are offered in four standard wheel-base lengths from 146 in. to 194 in. for the truck, and three wheel bases from 141 in. to 158 in. on the tractor. The EQ chassis is illustrated above. Note its deep frame and the modern treatment of the cab, hood and fenders.



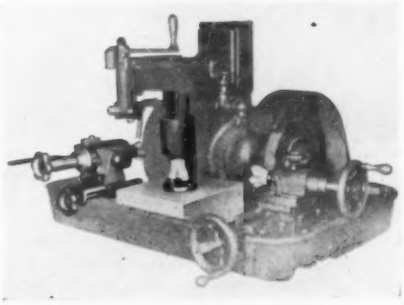
The sectional view just above depicts the new precision weighing, proportioning and batching machine announced during the year by the Jeffrey Mfg. Co., Columbus, O. The machine is known as the Waytrol and is featured by an automatic electric control sensitized through a device called the "electric brain." Made in a number of sizes they weigh to within one per cent. of absolute.



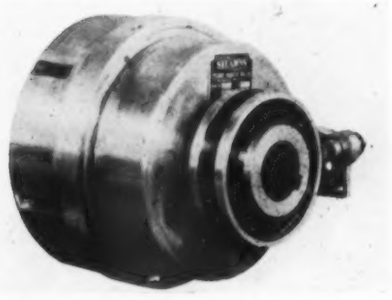
The old 24-in. by 36-in. Blake-type crusher weighed between 30 and 40 tons. The new Pioneer 24-36 jaw crusher pictured above weighs only 16 tons. Neither strength nor capacity has been sacrificed in the machine, however, the newer alloys and improved construction making the weight reduction possible. (Pioneer Engineering Works, Inc., Minneapolis, Minn.).

(RIGHT)—New 55-lb. Jackhamer in which low air consumption, because of improved valve design, is the principal feature. The drill is designed for hard hitting, fast work on deeper holes in extremely hard rock.

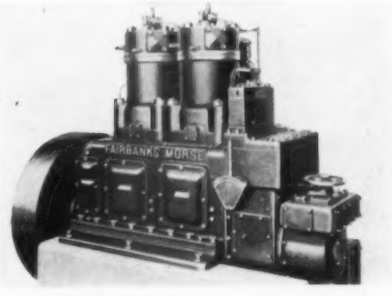
(BELOW)—New grinder for detachable-bits introduced last year by the Sullivan Machinery Co. Features are: automatic alignment, a rocking sleeve mounted on an adjustable base and a barrel with an expansion collet for gripping the bit.



A new electrostatic precipitator for dusts and general air separation announced last year by the Pangborn Corp., Hagerstown, Md. The complete unit consists of three parts: collector cells, ionizing assembly and power pack.

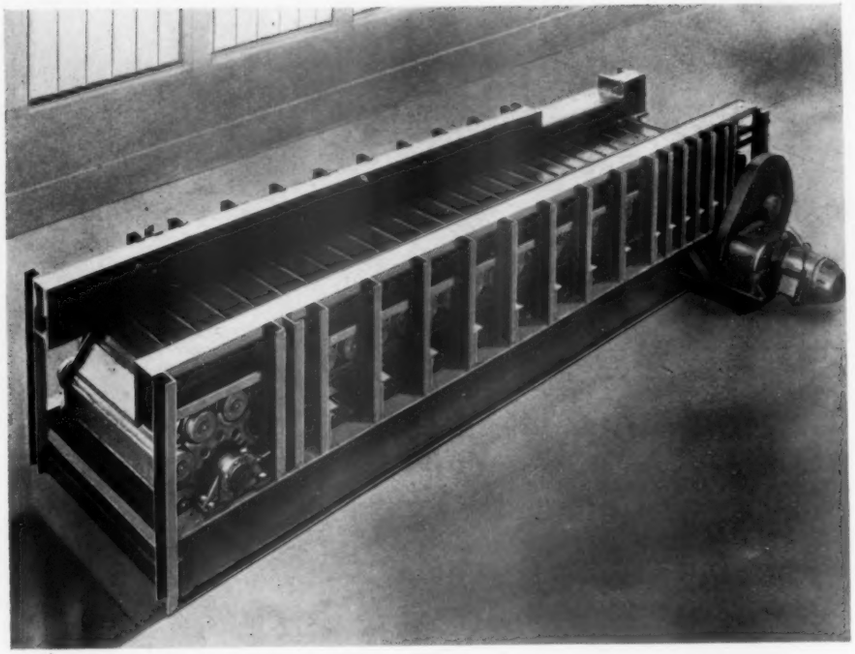


New type Style E magnetic clutch of compact, simplified design. Automatic self-alignment at all times is a distinctive feature. It is made by the Stearns Magnetic Mfg. Co., Milwaukee, Wis.

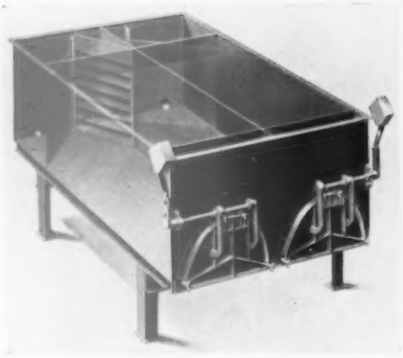


A small Diesel engine for heavy-duty, continuous service available in two- and three-cylinder combinations with ratings of 60 and 90 hp. at 450 r. p. m. Identified as Model 42-E. (Fairbanks, Morse & Co., Chicago.)

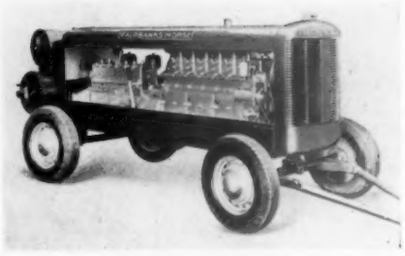
1937 Equipment Progress



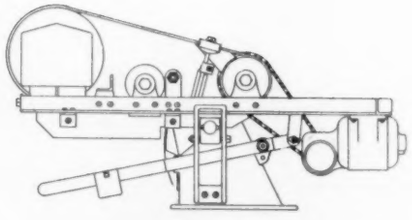
The Rorabeck apron feeder shown above was a 1937 development of the Link-Track Engineering Co., Chicago, Ill. It was designed primarily for feeding ore, stone and coal to crushers, pulverizers, screens and other processing equipment. This company is especially well-known for its conversion of locomotive-type excavating equipment to crawler mountings.



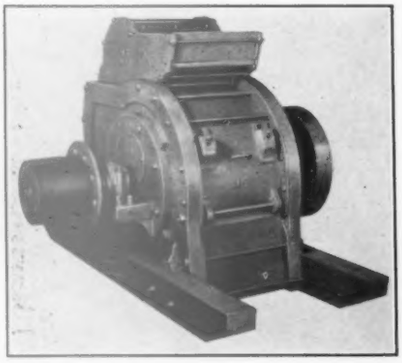
The rectangular tank multi-louver dewaterer shown in the phantom view above is made for use in smaller systems of multi-wash dust collectors where the quantity of water and sludge produced does not justify the use of larger capacity tanks. It was a 1937 development of the Claude B. Schneible Co., Chicago, Ill.



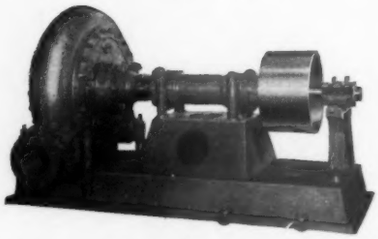
A new self-contained Diesel-powered air-compressor for portable service. Producing 210 cu. ft. of air per min. it is available in several types of mountings one of which is shown above. (Fairbanks, Morse & Co., Chicago, Ill.).



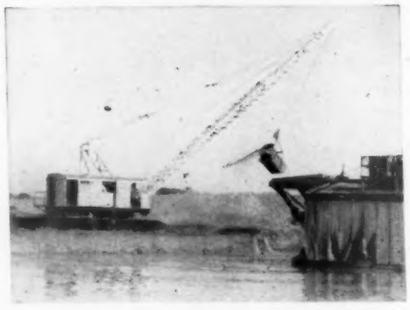
The above sketch illustrates a 1937 advance in the Hardinge constant-weight feeder wherein a magnetic pulley is incorporated in the construction to take out tramp-iron and other foreign magnetic substances. The improvement increases the already wide utilization of this type of equipment.



One of the products placed on the market in 1937 by Brooks Eqpt. & Mfg. Co., Knoxville, Tenn. was the swing-hammer pulverizer shown here. It has a feed opening to take "man-size" stone and a capacity of from 15 to 30 tons of finely-ground agricultural stone per hour. It is also idealy adapted to the production of fine road materials, chips, etc.



Main bearings on the new 6-in. heavy-duty sand pump pictured above are composed of two unusually heavy double rows of balls. The pump is equipped with special water-seal connections. (Kansas City Hay Press Co., Kansas City, Mo.).



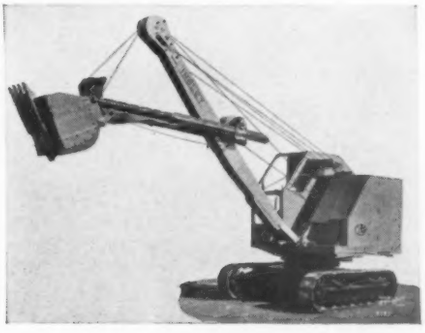
Bigger production on all classes of drag-line work is claimed for this 2½-cu. yd. machine by its maker, the Harnischfeger Corp., Milwaukee, Wis. Equipped with an 82- to 100-ft. aluminum boom, it has an extremely wide working range.

The Ingersoll Rand Co., New York, N. Y., introduced this new drifter drill called the DA-30. It is in the 125-lb. class. It is illustrated above equipped with autofeed and jackbit. A new double-opening valve greatly increases drilling speed without increasing the air consumption.

Announced late in the year by the Four Wheel Drive Auto Co. of Clintonville, Wis., this truck chassis combines the rugged features inherent in this type of transport unit combined with an attractive streamlined design.

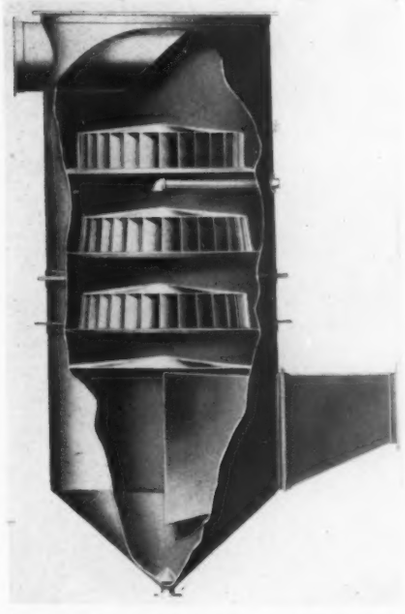
1937 Equipment Progress

A new line of crawler-mounted scrapers with several definite advantages was introduced by the Continental Roll & Steel Foundry Co., East Chicago, Ind. According to the manufacturer, mounting the scraper on crawlers allows it to be used in every kind of weather. All sizes of wagon scraper—5-, 7-, 10-cu. yd. models—are available with crawler units, the 10-cu. yd. size being available for field replacement of existing Continental wheel scrapers.

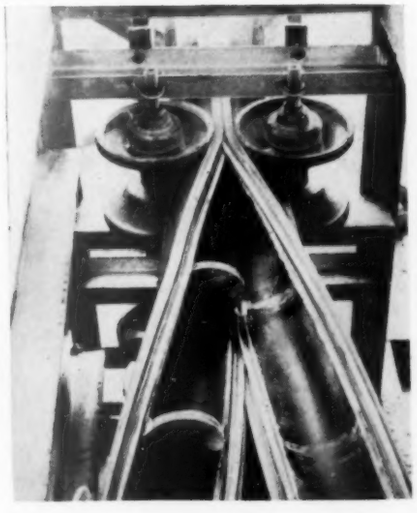


Full advantage has been taken of electric and acetylene welding and cutting to simplify and reduce the weight in the above ⅜-cu. yd. convertible excavator. Known as Type K, it is made by the Insley Mfg. Corp., Indianapolis, Ind. The Insley patented crowd assures speedy operation and close control of the dipper.

The new Utah positive electro-magnetic vibrating screen (Allis-Chalmers Mfg. Co., Milwaukee, Wis.) is particularly adapted to the separation of the finer materials. It is said to employ an entirely new principle in which standard a-c. power is used without resorting to expensive auxiliary equipment such as motor-generator sets.

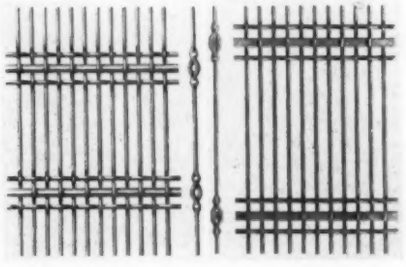


The Claude B. Schneible Co., Chicago, Ill., introduced a junior multi-wash dust-collector. Dirty air, gases, or fumes are scrubbed five times by an impingement-plate arrangement.

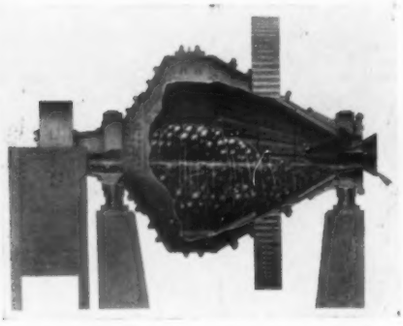


A new conveyor made of rubber to form a traveling pipe-line was one of the outstanding developments in the material-handling field during 1937. The rubber pipe, split in halves and fitted with flights, can handle either wet or dry materials conveying them horizontally, vertically or on a incline. (Johns Conveyor Co., New York, N. Y.)

Pipe threading is eliminated with the fittings illustrated above which require plain-end pipe only. Only an ordinary wrench is needed to do the job, the sketches in the above illustration showing the simplicity of installation. (S. R. Dresser Mfg. Co., Bradford, Pa.).

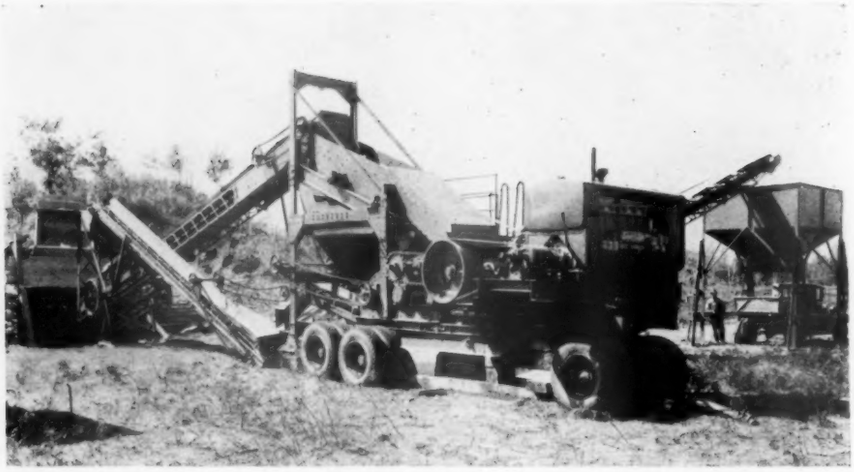


A further improvement in its line of Sta-Tru long-mesh woven-wire screen was announced by the Ludlow-Saylor Wire Co., St. Louis, Mo. The above illustration indicates the improvement. At the left is shown the original screen with the straight stay rods. At the right is shown the new screen with the oval stay-bar weave which relieves the wires of crimping strains so that vibration has no destructive effects.



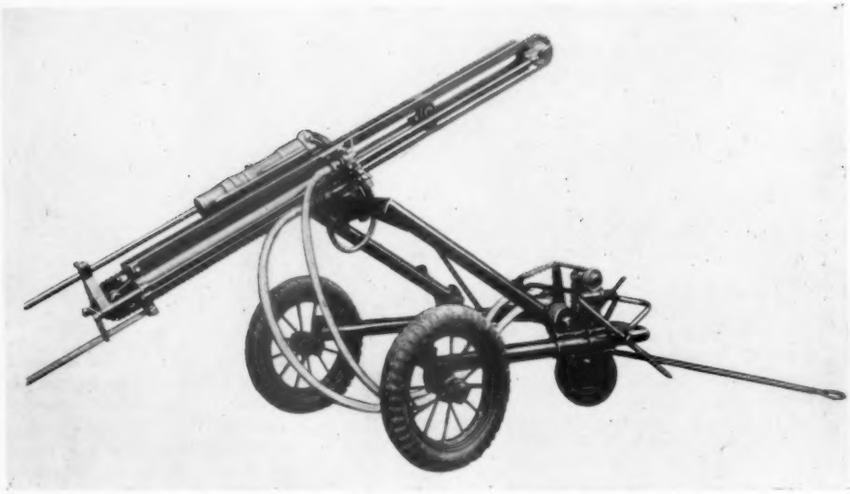
Illustrated above is a cut-away view of the improved Hardinge mill. The mill as improved employs a reverse-cone grate and a high pulp-level discharge. The company claims these improvements mark the biggest advance in wet grinding in fifteen years. (Hardinge Co., York, Pa.).

1937 Equipment Progress

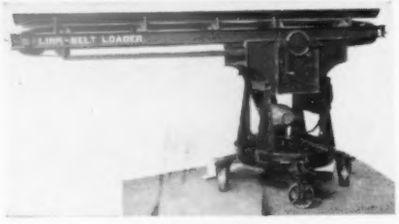


The dual gravel-crushing, screening and loading plant illustrated was a 1937 development of the Universal Crusher Co., Cedar Rapids, Ia. The entire assembly is mounted on a heavy-duty, goose-neck type of a six-wheel truck supported by twelve pneumatic tires. Standard Universal equipment is employed, including a jaw crusher, roll crusher, double-deck gyrating screen and a sand rejector.

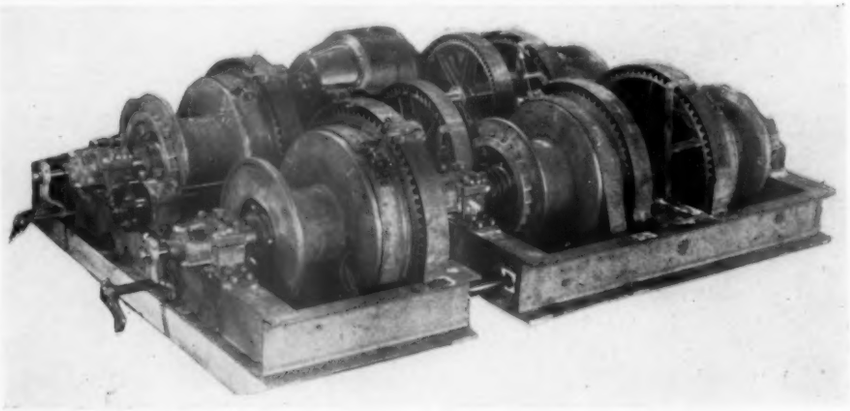
The Model 25 shovel illustrated above was the first 1937 development of the Northwest Engineering Co., Chicago, Ill. The outstanding characteristic claimed for this machine is speed. Its bucket capacity is ¾ cu. yd. Bases are cast of steel; side frames are cast integral with the rotating base. Travel gears are fully inclosed and the entire crawler design is engineered and built exclusively for shovel service. All high-speed shafts are mounted on ball or roller bearings.



The Thor 6-ft. change wagon-drill illustrated above is extremely light and mobile and may be used in many places where a larger drilling unit would be impractical. The unit consists of a 3-wheel chassis supporting an adjustable "U" frame on which is mounted a pneumatic feed. The unit is equipped with adjustable front wheels, a centralizer and peg points and is adjustable as to horizontal and lateral movements. (Independent Pneumatic Tool Co., Chicago, Ill.).



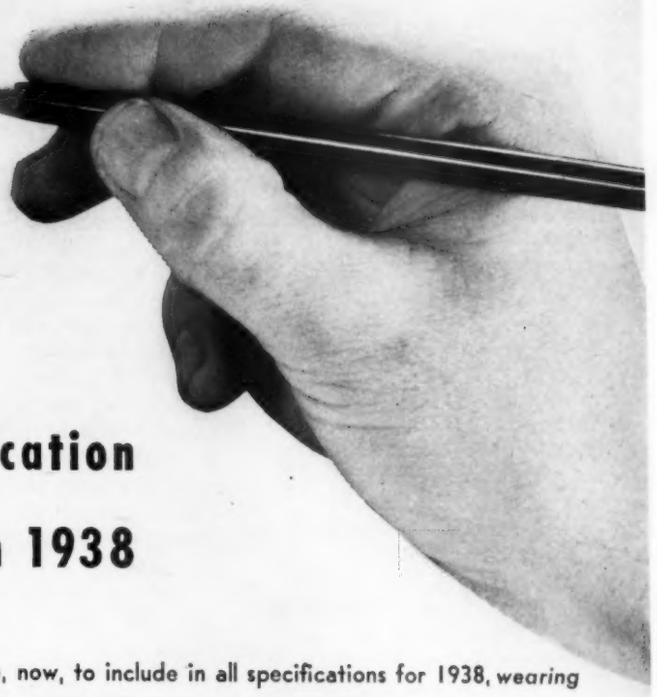
Announcement was made by Link-Belt Co. of a new type, inexpensive box-car loader. The loading element is a belt-conveyor supported on a horizontal boom which is arranged so that it can be racked back and forth or completely rotated by hand on the caster-mounted truck on which the boom is mounted.



Illustrated above is the completely revamped dredge hoist made by the Morris Machine Works, Baldwinsville, N. Y. The cast-iron base has been eliminated and a welded-steel base is now employed. The arrangement of drums and bearings has been changed to give better leads and to eliminate the mounting of more than one drum on a shaft. Morris developments also included the introduction of a light-duty pump, and the redesign of numerous other pumps, including particularly the elimination of seals on the dredging pupms and the introduction of the float-type sealing ring on its clear-water pumps.

What is claimed to be an entirely new principle in feeding drifting drills is found in the above illustrated motor-feed drifter which was a 1937 development of the Gardner Denver Co., Quincy, Ill. This drifter does not utilize vibration and therefore has much smoother operation than the old type vibration-fed drills.

Tisco



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Occupational Diseases and the Law

Common-Law Action

The Pennsylvania Supreme Court held in *Billo v. Allegheny Steel Co.*, decided November 12, 1937, that where there is nothing in the pleadings or in the evidence to remove either the employer or the employee from the provisions of the Workmen's Compensation Act, an action for damages from the occupational disease of silicosis is not barred "by the employee's voluntary and contractual surrender of his right to any form or amount of compensation or damages for any injury or death occurring in the course of his employment other than as provided" in the act. The provisions of the act apply only to cases arising from accidents, and occupational diseases do not so arise. In Pennsylvania an employee has a common-law right of action against his employer for injuries caused by disease contracted in the course of his employment and due to the negligent conduct of the employer in violation of a statutory duty.

Silicosis; Accidents

In *Svoboda v. Mandler*, decided October 29, 1937, the Nebraska Supreme Court holds that alleged minor accidents which are not shown to have accelerated or aggravated or changed in any way the slow, steady progress of an occupational disease can not be made the basis for a recovery under the Nebraska Workmen's Compensation Act. The claim for compensation was made by the widow of a deceased sand-blaster; it was alleged that two accidents—once when the nozzle came off the hose and once when the hose broke while sand-blasing, and sand was forced into the workman's nose—were the proximate cause of death.

Common Law; Estoppal

Dixon v. Gasco Pump & Burner Mfg. Co., decided by the Oklahoma Supreme Court, November 16, 1937. In this case it is held that where complaint was filed with the State Industrial Commission for "accidental injury" under the provisions of the Workmen's Compensation Act and the cause is dismissed upon the ground of lack of jurisdiction, and such ruling is sustained by the court on appeal, the injured party is not estopped from maintaining a common-law action or an action under an applicable statute, for damages for alleged injury, based upon negligence.

The worker sought to recover damages on account of the occupational disease of carbon-monoxide poisoning alleged to have been contracted by reason of poisonous fumes negligently permitted to escape in the employer's plant. The state supreme court holds that such an action is maintainable under the common law and also under Sec. 10890 of the Oklahoma Statutes, which creates a right of action in case of injuries due to an employer's negligence as to equipment, etc.

Common-Law Right

In *Andris et al v. DuPont Cellophane Co., Inc.*, decided November 30, 1937, the United States Circuit Court of Appeals follows a number of earlier decisions of the Illinois Supreme Court

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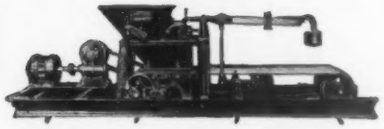

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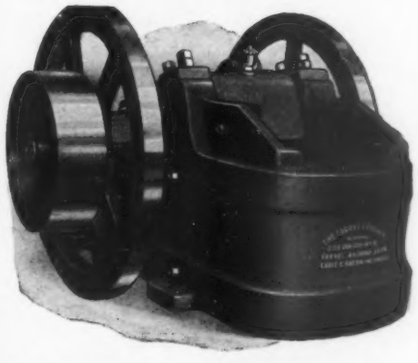

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Personal Mention

W. K. HATT, head of the civil-engineering school and director of the materials-testing laboratory at Purdue University has been relieved of his administrative duties for the purpose of organizing the Joint Highway Research Project between the Indiana State Highway Commission and Purdue University for which the legislature has appropriated $50,000 a year. Prof. Hatt, who is well-known in the industry for his research in aggregates and concrete, has been a member of the Purdue faculty for 44 years.

C. T. RABER, formerly senior chemist, Pennsylvania State Highway Department, is now chemical engineer with the Glens Falls Portland Cement Co., Glens Falls, N. Y.

J. C. PEARSON, Lehigh Portland Cement Co.; and STANTON WALKER, National Sand & Gravel Assn., have been appointed members of A.S.T.M. Committee E-6 on Papers and Publications.

A. A. NELSON has joined the sales force of the Robins Conveying Belt Co., covering the eastern end of New York state and the western part of Connecticut.

W. E. WECHTER has been made manager of oil and gas engine sales, Atlantic division, by Worthington Pump and Machinery Corp. Mr. Wechter succeeds R. L. HOWES, who recently resigned.

STANLEY M. HUNTER has been appointed manager of sales for the American Hoist & Derrick Co. of St. Paul, Minn. Mr. Hunter has been associated with the company for the last two years.

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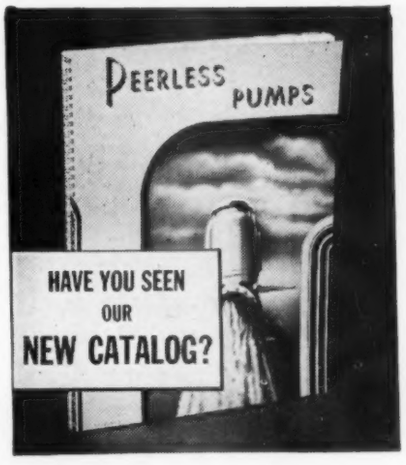

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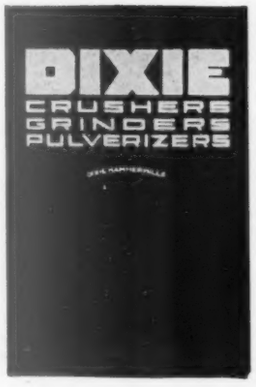

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O. E. R. McMULLEN and C. A. MacLAREN, of the University of Pittsburgh civil engineering department, conducted a short course in concrete design and construction Dec. 14 to 16 inclusive at the Cathedral of Learning, on the university campus.

ANDERSON DANA, president of the Seaboard Sand & Gravel Corp., New York, N. Y., has been chosen to head the sand-and-gravel section of the New York Board of Trade.

EARL M. OREN, former advertising manager of the United States Gypsum Co., is editor and publisher of a new monthly publication, *Building*, devoted to reporting trends in the construction and building fields.

E. N. GUSTAFSON has been named assistant to C. A. CLARK, district engineer for the Portland Cement Assn. at Austin, Tex.

R. M. BEATON is now sales manager of the Glens Falls Portland Cement Co., Glens Falls, N. Y. Formerly he was district manager in metropolitan New York for the Universal Atlas Cement Co.

E. TONNESEN, manager of the Hennenman (Orange Free State) Portland-cement plant of Anglo-Alpha Cement, Ltd., Johannesburg, South Africa, died a short while ago after a brief illness of pneumonia.

DONALD KOCH has been appointed chief chemist of the Giant Portland Cement Co., Egypt, Pa., succeeding S. G. McANALLY who has gone to Sao Paulo, Brazil to become general manager of the Brazilian Portland Cement Co.

E. E. DUQUE, general manager of California Portland Cement Co., Colton, Cal., has announced that a bonus of $12 to $25 was paid Dec. 17 to each of the 600 employees in the Colton plant.

W. W. DEADMAN, superintendent of the Lone Star Cement Co. plant at Bonner Springs, Kan., has recovered from an illness of several weeks duration.

C. H. HOCKENBURY and his four sons have purchased the half interest in the Silverdale Limestone Co, near Silverdale, Kan, formerly owned by William Guiring of Wichita, Kan., and are now sole owners of the enterprise.

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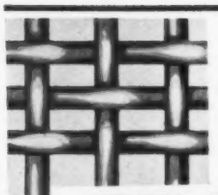

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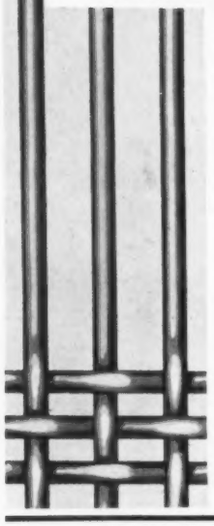

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W. JESS BROWN, president, Dixie Sand & Gravel Co., Chattanooga, Tenn., is retiring as president of the Engineers' Club of Chattanooga. His successor for 1938 is C. E. McCaslin, district engineer for the U. S. Geological Survey.

GEORGE DEMPSTER, who retired Jan. 1, 1938, as city manager of Knoxville, Tenn., has been offered the position of engineer-manager for the Tennessee Road Builders' Assn. composed of contractors, equipment dealers and manufacturers of road materials in Tennessee.

F. R. MCMILLAN, director of research, Portland Cement Assn., and F. D. COPPOCK, president, American Aggregates Corp., Greenville, O., were among the recent visitors at Grand Coulee Dam in the state of Washington.

PHIL BUSHNELL has been made manager of the safety and personnel department of the Missouri Portland Cement Co. He was formerly a Portland Cement Assn. safety engineer.

T. M. ROBIE has been made manager of the Diesel-engine sales division of Fairbanks, Morse & Co., Chicago, Ill. He has been connected with the company since 1919.

PROF. EMORY D. ROBERTS, 47, chairman of the civil-engineering department of Marquette University school of engineering, and an outstanding authority on reinforced concrete, died Nov. 23 at a Milwaukee, Wis., hospital after a long illness. He was at one time a contributing editor of PIT AND QUARRY. Born in Gresham, Ore., he was graduated in 1922 from Oregon State college. Industrial and educational work after graduation schooled him in engineering projects such as irrigation, suspension bridges and ocean terminals. In 1924 he joined the Marquette University staff.

EDWARD L. MARSH, 57, former secretary and treasurer of the United States Gypsum Co. and a director of the company for the last nine years, died at his home at Old Lyme, Conn., on Nov. 21.

J. B. SMYTH, 68, president of the Uvalde Rock Asphalt Co., San Antonio, Tex., for the last fifteen years, met his death in an automobile accident a short time ago.

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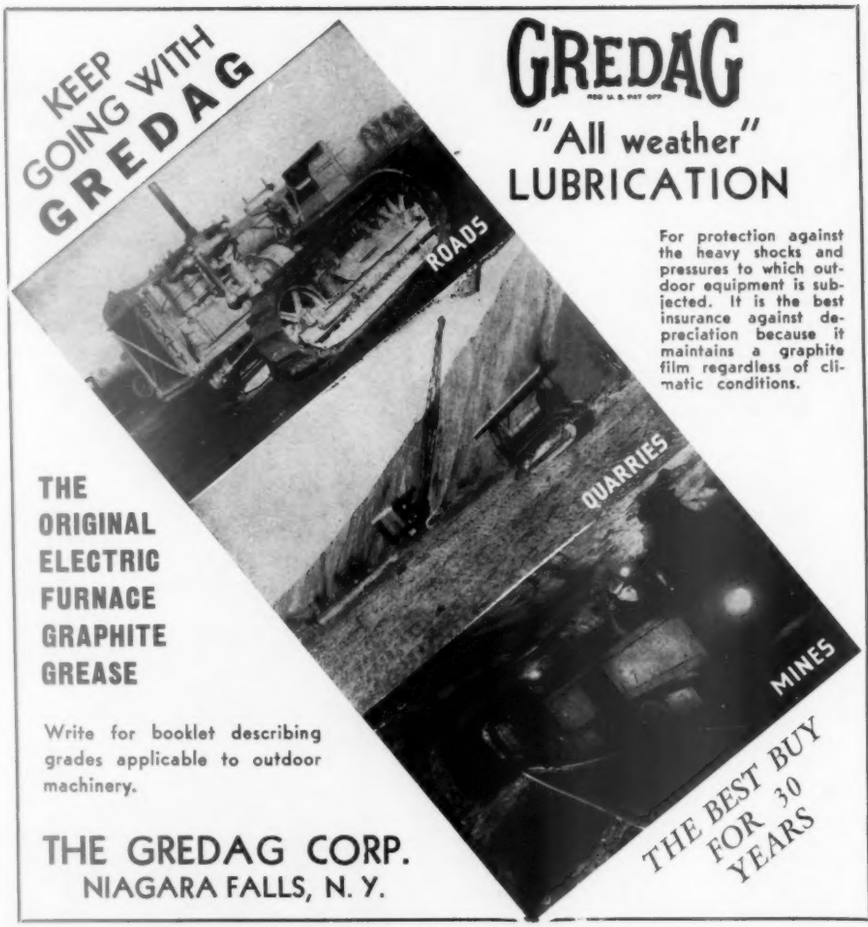

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HARRY E. WEST, president of the H. E. West Sand Co., Muskogee, Okla., was almost instantly killed Nov. 7, when struck on the head by a pulley block at his plant near that city. The block pulley pulled loose from a tree when being used to move a load of concrete blocks.

ELMER J. SCHEUERMAN, sales manager of the Jaeger Machine Co., Columbus, O., died Nov. 26. He had been connected with the Jaeger firm and the Lakewood Engineering Co. for twenty years.

WALTER E. TATE, 59, vice-president and general manager of Georgia Marble Works, Tate, Ga., was killed in an automobile accident near Ellijay, Ga., Dec. 14.

THOMAS H. GRAHAM, 69, widely known aërial-tramway erector, contractor, and official of the Riblet Tramway Co., died recently at Spokane, Wash.

ALFRED M. LUTTRELL, 57, general manager of the Brooksville, Fla., plant of the Consolidated Rock Products Co., Lakeland Fla., for the past eleven years, died recently in a Tampa hospital.

INCORPORATIONS AND CHARTERS

EASTERN WYOMING BENTONITE CO., Moorcroft, Wyo., has filed articles of incorporation with the Wyoming secretary of state, with a capitalization of $25,000. Directors: L. F. Fletcher and Frank E. Burdick, Jr., both of Moorcroft, and C. M. Hagerman of Upton, Wyo.

CARROLL COUNTY GRAVEL CO. has been incorporated in Carrollton, Mo., with a capital of $10,000, by C. E. Miller and H. L. Hams.

WESTERN LIME QUARRIES is the style under which J. H. Prescott, F. F. Miller and A Miller have engaged in business at Baker, Ore.

OHIO VALLEY STONE CORP., 102 East Court Ave., Jeffersonville, Ind. Capital 200 shares of $25 p.v. Incorporators: David B. G. Rose, Lincoln Miller and Jonas G. Howard.

ELAM SAND & GRAVEL CORP., Rochester, N. Y. Correspondent: William B. Gelb, 111 Wilder Bldg., Rochester. Capital 200 shares n.p.v.

SALISBURY CONCRETE PRODUCTS CORP., Salisbury, Md. Capital 50 shares of $100 p.v. Incorporators: Joseph Yough, Charles Youch, and William W. Travers.

Traffic News Digest

Legislation

Train Limit—During the past few years we have witnessed the building of taller skyscrapers, the drilling of deeper oil wells and the building of more powerful locomotives to pull longer freight trains. It seems to be an American characteristic to want to break all previous records for size or speed or any other unit that might be used to measure the limitations of anything designed or constructed by man. Certainly the proposed legislation to limit the length of the freight train has come to the attention of newspaper editors throughout the country as evidenced by numerous editorials on the subject. Hearings on this proposed legislation are to begin on January 11 before the House committee on Interstate and Foreign Commerce. Various organizations of shippers have adopted resolutions opposing this bill and many individuals are asking their Congressmen to work against it. The National Industrial Traffic League at its annual meeting in Chicago in November re-affirmed the league's position against the train length limit bill and against any alternative legislation which would place the matter of the length of trains under the jurisdiction of the Commission.

Recent I. C. C. Decisions

Amiesite — The commission has awarded reparation of $59.22 with interest on finding that the charges collected on a carload of asphalt-coated gravel from Mayfair, Ill. to Kalamazoo, Mich., shipped June 19, 1934 were unreasonable to the extent they exceeded charges that would have been approved on the basis of the actual weight of the shipment. I. C. C. Docket No. 27,712, Barber Construction Co. *v* M. C. R. R. *et al.*

Ground Limestone—In response to fourth-section application No. 16,937 carriers have been granted authority to establish rates on ground or pulverized limestone from points in Pennsylvania and Maryland to destinations in North Carolina without observing the long-and-short-haul clause of section 4. I. C. C. F. S. O. No. 12,984 Limestone Pennsylvania District to North Carolina.

Examiners' Reports

Motor Rates—The proposed report of Joint Board 160 in the case of Central States Motor Freight Bureau, Inc. against Mercury Transportation Co. indicates that the era of low truck rates is rapidly passing. In this case the defendant has published commodity rates on articles which were carried on a class rate basis by members of the motor freight bureau. This resulted on lower rates on certain of these articles and complaint was brought that this resulted in unreasonable rates, unjust discrimination and undue prejudice. The defendant testified that the operating costs averaged approximately $37.50 a round trip between Chicago and St. Louis which would make the truck mile cost $.0625. The board pointed out in its report that many items of cost were not included which would have increased this figure. In its proposed findings that the de-

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Kanawha Sand Company, at Parkersburg, W. Va., obtain a lot of convenient, reliable and yet mighty cheap power for their crusher and screens. Mr. C. Z. Ruth, President, and Mr. A. A. Barringer, Engineer, selected a Cooper-Bessemer, 325 H. P., Diesel Electric Set as their source of low-cost power...*and profit*! Investigate Cooper-Bessemer Diesel and Gas Engines...economy champions!

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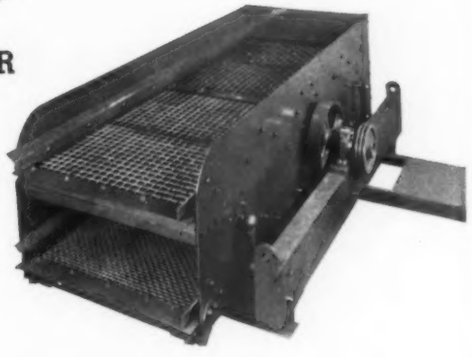

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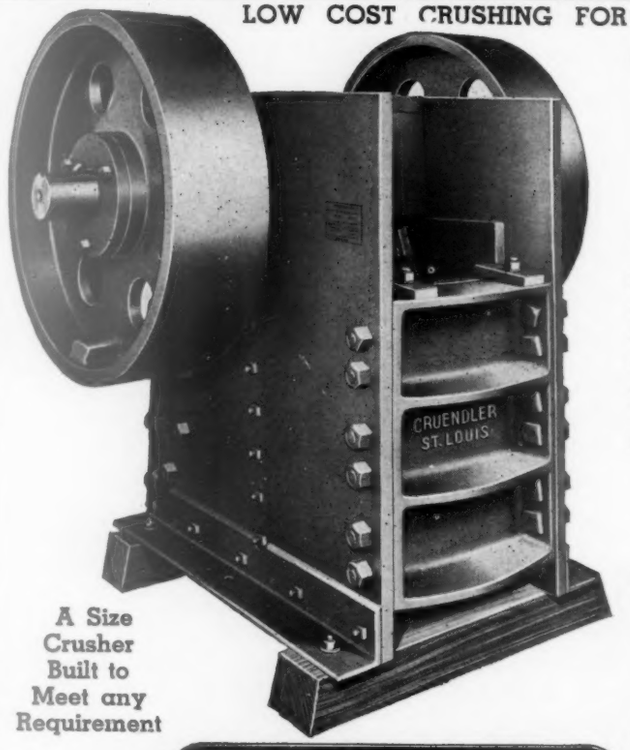

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fendant's rates were unreasonably low, it pointed out that the Supreme Court recognized that a rate may be unreasonable because it is too low as well as because it is too high in a case reported in 167 U.S. 479. Some interesting comments of the board include the opinion that the application of less-truck load rates tends to break down the normal classifications with the depletion of the carrier's revenues and that it is evident that if complainants were to meet the rates of defendants, many of the carriers would be compelled to operate at a subsequent loss. It is equally apparent that the establishment of such rates by the Commission would upset and disrupt the rate structure of all carriers in the considered territory and create discriminatory and prejudicial as well as unfair and unconstructive practices. Such a policy would be contrary to the provisions of sections 202 (a) and 216 of the act. The need for a uniform rate level for application in the considered territory is apparent. The allegation of unjust discrimination and undue prejudice have not been sustained. I. C. C. Docket No. MC C-40 Central States Motor Freight Bureau, Inc., *v.* Mercury Transportation Co.

Sand—Examiner Burton Fuller recommends that the Commission award reparation of $137.28 with interest on finding that the rates on core sand from Davisville, R. I., to Coxsackie, N. Y., be found to have been unreasonable between Feb. 17, 1932 and June 5, 1935 to the extent it exceeded $3.05 a net ton.

New Complaints Filed

Ground Limestone—In a complaint filed by George Duffy, 491 Bourse Bldg., Philadelphia, Pa., the rates on ground or pulverized limestone offered to buyers under the commercially-accepted name of "whiting" from Camden, N. J. to destinations in official and southern classification territories are allegedly in violation of sections 1, 2, 3, and 4. This condition is brought about by the carriers having established a different tariff description and tariff classification of pulverized limestone for competitors of the complainants than that on which the complainant is compelled to ship which gives preference to the competitors. The complainant asks that the Commission prescribe the publication of rates which were ordered in Docket No. 25,221 American Lime & Stone Co. *et al v.* Pa. *et al* as reported in 201 I. C. C. 467. I. C. C. Docket No. 27,921 Southwark Mfg. Co., Camden, N. J., *v.* Pa.—Reading Seashore Lines, *et al.*

Sand—Reparation is sought in connection with a shipment of silica sand in box cars from Ottawa, Ill. to Thorold, Ont., Canada which complainant contends is in violation of section 1. The complaint was filed by L. V. Brandt, E. O. Anderson, R. A. Peekens, 2218 S. Michigan Ave., Chicago, Ill. in I. C. C. Docket No. 27,915 Exolon Co. *v.* Belt Railway Co. of Chicago, *et al.*

Traffic News

Fifteen Per Cent. Case—The request of the railroads for an increase of 15 per cent. in all freight rates and an increase in passenger fares in the east now being considered by the Commission in Ex Parte 123 has been broadened to include switching lines, intercoastal steamships, the government barge line and trucking rates. Those favoring the proposed increase have been heard by the Commission and dates for receiving the testimony of those opposing the petition have been announced. So far the most active opposition to the proposed increase has come from the coal, lumber and aggregates interests. The National Coal

Assn. has been very active in the publication of information showing that the coal industry is not in position to stand an increase in coal rates. While the coal industry is opposing increased freight rates the railroads are using the higher prices of coal as established by the Bituminous Coal Commission as a reason why all freight rates should be increased. In the case of general increases in freight rates there is always more or less confusion caused by the failure of state commissions to allow an increase in intra-state rates to go into effect concurrently with an Interstate increase. In this case the state commissions are well represented on the bench along with the Interstate Commerce Commission. The railroads estimate of the additional revenue which would accrue through the proposed increase amounts to $458,353,000.00 of which $47,502,000.00 would come from increased passenger fares. The carriers estimate that the increased cost of fuel, payroll tax, unemployment compensation tax, railroad retirement tax, tax on wage increase and pensions taken over both railroad retirement board total $614,787,000.00 or $66,436,000.00 more than the increase in rates and fares are expected to yield. A number of letters have been written to the Commission both for and against the petition of the carriers. Apparently the people writing the letters do not know that such letters do not become a part of the proceeding and are not considered when the decision is made. Only sworn testimony or briefs based on such testimony can be considered in making a decision. Luther M. Walter, a trustee for the C.&G.W. urged that the Commission request a pooling of the increases to be distributed to those carriers which had failed to yield a sufficient amount to pay their fixed charges. Mr. Walter contended that a 4% increase in freight revenue if pooled and applied to roads which are failing to yield fixed charges would put all American railroads on a sound financial basis, including those which are now in bankruptcy. He further contended that one of the main reasons why some railroads were in financial difficulties was that they were accorded unfair divisions.

While the Commission can not by law be responsible for the general welfare of the country the railroads in their testimony used a great deal of time in telling how the country in general would profit by the increase in freight rates. This trend is probably best summarized in the testimony of J. J. Pelley, President of the Assn. of American Railroads who said:

"Normally the railroads are a billion-dollar-a-year customer of all industry. The dollars which railroads spend for the thousands of things they buy, like the dollars which they spend in payrolls, spread over the whole United States and go into almost every industry. With adequate revenues, we may reasonably expect a revival of railroad buying, and I know of no greater single stimulus to industry and employment."

During the hearing several motions were filed asking for dismissal of the petition. All of these motions were over-ruled. The shippers met on the first day of the hearing and elected a steering committee which included among others F. F. Estes, representing bituminous coal, E. S. Gubernator, cement, John F. Finnerty, speaking for the Glass Container Assn. of America and representing cement, lime, gravel, etc. and J. R. Hoover, representing stone. Mr. Finnerty was also appointed to the committee in charge of cross examination of witnesses and to the committee to arrange for further hearings. Later V. P. Ahearn was added to the steering committee to represent sand, gravel, crushed stone and

GOOD NEWS

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Now you can cut your pipe replacement costs in half by standardizing on Armco Spiral Welded Dredge Pipe. Made of tough, abrasion-resisting steel developed especially for hydraulic dredging operations, it consistently *outwears ordinary pipe from 50 to 200 per cent.*

And that's only the beginning of its economy. Armco Dredge Pipe has *abundant strength* to withstand high pumping pressures, severe beam action and other destructive forces. Its smooth interior guarantees *high carrying capacity.* And its long lengths (up to 60 feet) assure rapid, easy handling on the job.

Armco Dredge Pipe is quickly available in diameters from 6 to 36 inches with wall thicknesses as required. Ends may be provided for flanges, Dresser-type couplings, or adapted to rubber sleeves, or ball joints. Where slip joints are desirable, we can supply machine contracted ends formed integral with the pipe.

Address your inquiry to: The American Rolling Mill Co., Pipe Sales Division, 281 Curtis St., Middletown, Ohio. We'll respond promptly.

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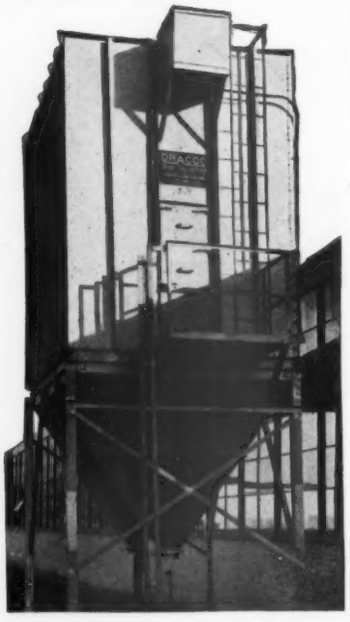

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slag. The only time the advisibility of reconsidering the wage advance granted by the railroads last August was made was in the testimony of Mr. Walter appearing for the C.&G.W. He expressed the opinion that American labor should receive a good wage but that the wage increase might not work and should be reconsidered on the theory that while labor was entitled to high wages it should not insist on wages so high so as to destroy the railroad corporations. On Dec. 9 the carriers asked the commission to permit the 15 per cent. advance in freight rates to be made effective at once and that the advance be allowed pending the conclusion of Ex Parte 123. This request was refused by the Commission. A number of witnesses were heard representing railroad security owners and several prominent shippers and trade associations appeared in favor of the increased rates. The report of the committee of the Chamber of Commerce of the U. S. contained the following conclusions:

"The railroads are in urgent need of substantial increase in revenues; this urgent need can be met only by increasing rates; increases at this time are justified in the public interest; rate changes of a sweeping character, both up and down, have been made to meet changed conditions on a number of occasions in the past twenty-five years; the character and extent of such changes are proper questions for decision by the Interstate Commerce Commission in accordance with its established procedure; the public interest requires the greatest practicable expedition in the decision of the pending general railroad rate case, Ex Parte 123."

The schedule for hearings to receive testimony from those opposed to the increase includes hearings at Atlanta, Ga., El Paso, Tex., New Orleans, La., Los Angeles, Calif., Chicago, Ill., Salt Lake City, Utah, Portland, Ore., and Washington, D. C. at various dates; the last hearing beginning on January 17, 1938.

Southern Governors' Rate Case—The complaint in this case has been amended by eliminating the state of Kentucky as a complainant. The chambers of commerce of various eastern and central cities petitioned the Commission to consolidate the southern governors' complaint which is being considered under docket No. 27,746 with Southern Class rates 1937 under docket No. 27,655. The Commission denied these petitions. Later a letter was received by the Commission from Wilbur J. LaRoe, Jr. representing the southern governors, stating that in view of the turn for the worse in business conditions the southern governors believe the time is not appropriate for going forward with evidence in docket No. 27,655. This means of course, that there will be no hearing in this case for a long time.

New Pump Alloy

Diamond alloy is a new metal developed in the laboratories of Pettibone Mulliken Corp. It was originally developed to be used in pumps handling sand in suspension in the water.

The particular pumps for which the metal was developed were required to handle sand in water which contained a percentage of acid. Other alloys just as hard as Diamond alloy have been used but it was found that the acid in the water had a corroding effect that was almost as serious as the abrasive effect of the sand.

Diamond alloy was developed to withstand both these actions. Trial applications proved very successful and the length of life of the pump parts was increased considerably.

Diamond alloy has a Brinell hardness of 550 to 600 and a tensile strength of from 60,000 to 80,000 lb. per sq. in.

Foreign Developments

Theoretical Study of Hydraulic Binders

The investigations reported sought a verification of the theory of hydraulic setting as expressed by H. LeChatelier in 1887, according to which a hydraulic binder presents a system of anhydrous compounds instable in the presence of water, which form with the water a new stable system. According to the rules of thermodynamics the anhydrous compounds always have a higher solubility in water than their hydrates, so that in the gaging water there is a supersaturated solution in regard to the hydrated compounds. The crystallization of the hydrate out of this solution causes the process of setting.

While LeChatelier always had in mind only the conversion of instable anhydrous to stable hydrate compounds, the view was expressed by Rengade that this theory must also be applicable to processes in which no hydrate is formed but in which the water acts only as a solvent. The setting of aragonite is an example. Aragonite is the instable modification of calcium carbonate, while calcite is the stable modification. According to the general rules of thermodynamics the solubility of aragonite is higher than that of calcite. The authors were in fact able to show that finely powdered aragonite mixed with water hardened, with a gradual conversion to calcite.

If the theory of LeChatelier is ascribed to still more simple fundamental principles, a setting process can be expected from the dehydration of a system, as for example:

$SiO_2 + BaO.9H_2O \longrightarrow SiO_2.BaO.6H_2O + 3H_2O.$

This view gains significance for the behavior of alumina cements at a temperature of around 30 deg. C., where these cements show a decided minimum of hardening power. While such mortars harden energetically below 25 deg. C., with the formation of the hexagonal hydrate $Al_2O_3.2CaO.7H_2O$, the hardening proceeds more slowly above 35 deg., with the formation of the cubic hydrate $Al_2O_3.3CaO.6H_2O$. But at about 30 deg. no set takes place even after

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This balancing trick may appear easy, but perfect balance requires years of practice.

The same is true of the Counter-balanced Eccentric Shaft, the spectacular feature of the Simplicity Gyrating Screen, which is responsible for its positive action and smooth performance. This counter-balance is machined directly on the shaft, and it exactly balances the weight of the entire vibrating screen deck assembly.

Some of the other features engineered into the Simplicity Screen are:

Rubber cushioned power

Full effective screen area as indicated by size of deck

Counterflow action with gravity utilized to convey the oversize

Freedom from blinding with any size screen opening

Protected roller bearings

Enduring construction

See the actual demonstration of these important construction features at the exhibit of the Simplicity Engineering Company space B-24, Cleveland Road Show, January 17-21. A 5'x10' triple deck Simplicity Gyrating Screen, weighing 9500 pounds will be shown, operating at a speed of 1200 R.P.M., suspended by rods from a steel frame. You will see the perfect balance of the Simplicity Screen plainly demonstrated by the smoothness with which this brute size unit operates.

For heavy-duty screening service, specify a Simplicity—made in 12 standard sizes with single, double, or triple deck, and tandem combinations.

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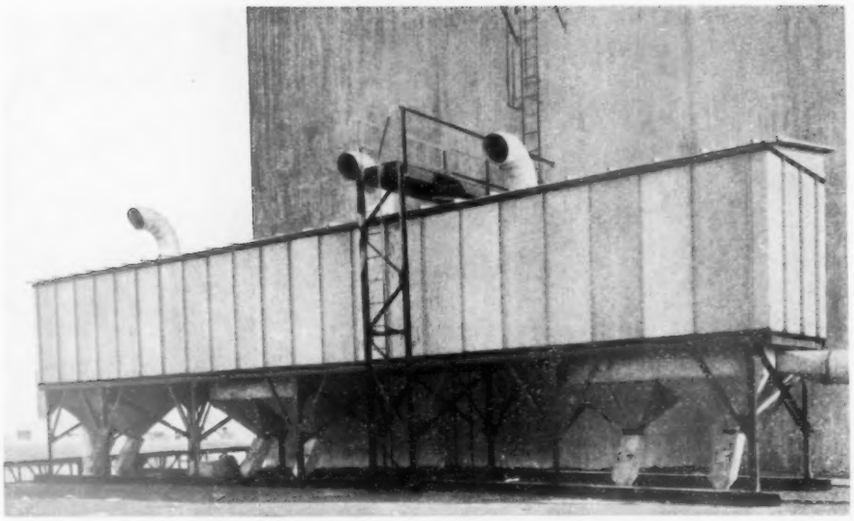

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SIXTEEN years of repeat business would imply that sound engineering is worthy of your investigation. Let us submit proven plans to eliminate dust from screens, grinding, packers, kilns and other dust generating equipment. In simple words let "Parsons Engineering" clear the air for you, and recover valuable materials.

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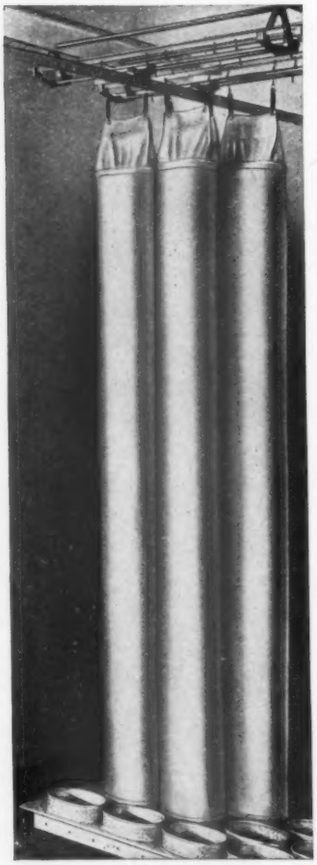

Parsons oval bag filtering units, showing Parsons patented overhead rockers and suspension springs and the oval bag plates in the bag house floor. Any filtering unit can be replaced in a very few minutes.

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3595 E. 82ND STREET CLEVELAND, OHIO

12 hr., and hardening goes on extraordinarily sluggishly. Normally hardened alumina cement specimens suffer heavy losses of strength if they are exposed for considerable time to a temperature over 50°. This diminution in strength is accompanied by a discoloration of the gray-black mortar to a dark brown shade. As the cause the authors cite the conversion of the hexagonal into the cubical aluminate, with expulsion of water: 3 ($A1_2O_3$.2CaO.7$H_2$0) 2(Al_2O_3.3CaO.6H_2O) + Al_2O_3-.3H_2O+12H_2O.—N. Iltschenko and H. Lafuma in *Chimie et Industrie*, September, 1937, pp. 438-440; *Tonindustrie-Zeitung*, 61:973, Nov 1, 1937.

Progress in Drying and Grinding-Mill Uses

In an article in *Zement* for Aug. 26, 1937 (26:539-545), Carl Naske reviews the progress in the construction and in the uses of combined drying-grinding mills since he published a similar article in the same journal four years ago. As to actual employment of mills of this type, hundreds are now in use as against a few dozen at that time; as to construction, the mills show a considerable simplification and increased effectiveness. A number of the German makes and types are described.

Developments in Testing of Cement for Road Building

During the past few years the standard tests for cement have been modified, particularly as to bending strength but also as to compressive strength and shrinkage, in connection with the construction of the German state automobile highways. This program has also given rise to interesting studies in the properties of cement and the bases for the production of cement, and the new tests have been of importance also for bridge construction, the concrete-products industry and reinforced-concrete construction. Some of the principal problems still outstanding are the testing of the reaction of cement to the drying-out of highway concrete, and the determination of the fineness of grinding and of the initial hardening at high atmospheric temperatures. Further researches are also needed on the practical properties of cement in regard to road construction; also, as certain iron-Portlands and blast-furnace cements have been found adapted to highway construction, research on the qualities and testing of such cements for such purpose.—Otto Graf in *Zement* 26:729-732, 743-747, 759-764, Nov. 11, 18, 25, 1937.

Trade Literature

Haiss Hustler Bucket Loader, 4 p. George Haiss Mfg. Co., New York, N. Y.

Dayton-Dowd Centrifugal Pumps, 16 p. Dayton-Dowd Co., Quincy, Ill.

Micromax Temperature Instruments for the Steam Plant. 32 p. Leeds & Northrup Co., Philadelphia, Pa.

Norblo High Speed, Low Power Exhaust Fans. 4 p. Northern Blower Co., Cleveland, O.

Industrial Dust Control Through Exhaust Systems. 56 p. Pangborn Corp., Hagerstown, Md.

Century Fractional Horsepower Motors. 24 p. Century Electric Co., St. Louis, Mo.

Self-Propelling MotoMove Portable Conveyors. 6 p. George Haiss Mfg. Co., New York, N. Y.

Harding Operating Data. 12 p. (Bulletin 41) Hardinge Co., York, Pa.

Primacord-Bickford Detonating Fuse. 16 p. Ensign-Bickford Co., Simsbury, Conn.

Excess Air—Is it Robbing You of Fuel? 12 p. *Hays Combustion Meters.* 16 p. The Hays Corp., Michigan City, Ind.

Fairbanks-Morse Vertical Motors. 4 p. Fairbanks-Morse & Co., Chicago, Ill.

The Day Pulverizer Co. and the Brooks-Payne-Osborne Equipment Co., both of Knoxville, Tenn., have effected a merger and the consolidated concerns will be known in the future as the Brooks Equipment & Mfg. Co.

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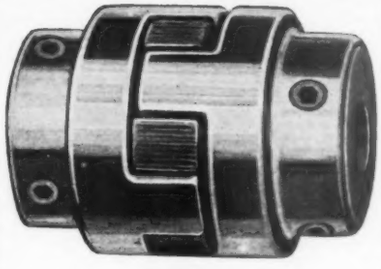

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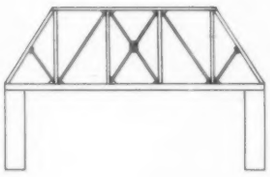

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Incorporated 1906

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BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

Although every effort is made to insure accuracy and completeness in these listings, the publisher cannot accept responsibility for errors or omissions. Any mistakes discovered will gladly be rectified

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*Manitowoc Engineering Works
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

Air Compressors (Portable)
*Chicago Pneumatic Tool Co.
*Curtis Pneumatic Machy. Co.
*Fuller Company
Gardner-Denver Co.
*Ingersoll-Rand Co.

Air Compressors (Stationary)
*Chicago Pneumatic Tool Co.
Gardner-Denver Co.
*Ingersoll-Rand Co.

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*Blaw-Knox Co.
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*Parsons Engineering Corp.
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*Ingersoll-Rand Co.

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*Gruendler Crusher & Pulverizer Co.
*Hardinge Co.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Sly Manufacturing Co., W. W.
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Alloys (Steel)
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Ash and Refuse-Handling Equipment
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*Warren Brothers Roads Co.

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*Link Belt Co.

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*Bucyrus-Erie Co.
*Harnischfeger Corp.
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Independent Pneumatic Tool Co.
Northwest Engr. Co.

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Taylor-Wharton Iron & Steel Co.
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Balls (Tube-Mill, etc.)
*Allis-Chalmers Mfg. Co.
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Barges (Steel)
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*Manitowoc Engineering Works

Batteries
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Bearings (Anti-Friction)
Bartlett & Snow Co., C. O.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Robins Conveying Belt Co.
*Sprout, Waldron & Co.
Timken Roller Bearing Co.

Bearings (Roller)
Timken Roller Bearing Co.

Belt Fasteners
Flexible Steel Lacing Co.

Belting
*Cincinnati Rubber Mfg. Co.
Goodyear Tire & Rubber Co.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
Manhattan Rubber Mfg. Co.
*Link-Belt Co.
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Republic Rubber Co.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.

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Manhattan Rubber Mfg. Co.
Republic Rubber Co.

Belt Lacings
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Republic Rubber Co.

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*Hercules Powder Co.

Blasting Supplies
Atlas Powder Co.
*Ensign-Bickford Co.
*Hercules Powder Co.

Block Machines (Concrete)
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Multiplex Concrete Machinery Co.

Block Machines (Power Press, Concrete)
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Multiplex Concrete Machinery Co.
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*Sprout, Waldron & Co.

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*Sly Mfg. Co., W. W.

Bodies (Motor Truck, Concrete Mixing)
Bartlett & Snow Co., C. O.
*Blaw-Knox Co.
*Concrete Transport Mixer Co.
Jaeger Machine Co
Ransome Concrete Machy. Co.

Boots (Rubber)
Goodyear Tire & Rubber Co.

Borings, Core
Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

Brick Machines (Concrete)
Dunn Mfg. Co., W. E.
R & L Concrete Machinery Co.

Brick Manufacturing Equipment
Dunn Mfg. Co., W. E.

Bronze Work (Ornamental)
National Wire Cloth Co.
*Tyler Co., W. S.

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Buckets (Clamshell, Orange-Peel, Etc.)
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*Blaw-Knox Co.
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*Harnischfeger Corp.
*Link-Belt Co.
Owen Bucket Co.
Pettibone-Mulliken Corp.
Taylor-Wharton Iron & Steel Co.
Wellman Engr. Co.

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Dempster Bros., Inc.
*Jaeger Machine Co.

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*Link-Belt Co.
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*Sauerman Bros., Inc
Taylor-Wharton Iron & Steel Co.
Wellman Engr. Co.

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Cross Engineering Co.
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*Hendrick Mfg. Co.
Iowa Mfg. Co.
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Pettibone-Mulliken Corp.
*Pioneer Engineering Works, Inc.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.
Taylor-Wharton Iron & Steel Co.

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*Koehring Co.
LeTourneau, Inc., R. G.

Bulk-Cement Storage Plants
Heltzel Steel Form & Iron Co., The
*Sprout, Waldron & Co.

Bulldozers
LeTourneau, Inc., R. G.

Cableways
*American Steel & Wire Co.
*Leschen & Sons Rope Co., A.
*Link-Belt Co.
*Roebling's Sons Co., John A.
*Sauerman Bros., Inc.

Calcium Chloride
*Calcium Chloride Association

Caps (Blasting)
Atlas Powder Co.
*Hercules Powder Co.

Caps (Blasting, Electric)
Atlas Powder Co.
*Hercules Powder Co.

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Cars (Block, Concrete)
Multiplex Concrete Machinery Co.

Car Dumpers
*Link-Belt Co.
Wellman Engr. Co.

Car Liners (Paper)
Hummel-Foley Corp.

Car Pullers
Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Carriers
Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
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*Robins Conveying Belt Co.
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*Koehring Co.
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Castings
American Manganese Steel Co.
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Frog Switch & Mfg. Co.
*Hardinge Co.
Hetherington & Berner, Inc
Holmes & Bros., Inc., Robt.
Iowa Mfg. Co.
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*Link-Belt Co.
McLanahan and Stone Corp
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*Robins Conveying Belt Co.
*Sprout, Waldron & Co.
Taylor-Wharton Iron & Steel Co.

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Central Concrete Mixing Plants (Comp.)
Bartlett & Snow Co., C. O.
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*Jaeger Machine Co.
*Sprout, Waldron & Co.

Chain Attachments
*Jeffrey Mfg. Co.
Taylor-Wharton Iron & Steel Co.

Chain (Dredge and Shovel)
Manganese Steel Forge Co.
Taylor-Wharton Iron & Steel Co.

Chain Drives
*Jeffrey Mfg. Co.
*Link-Belt Co.

Chain (Elevating and Conveying)
American Manganese Steel Co.
Bartlett & Snow Co., C. O.
Cross Engineering Co.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
*Sprout, Waldron & Co.
Taylor-Wharton Iron & Steel Co.

Chute Lining (Rubber)
Goodyear Tire & Rubber Co
Manhattan Rubber Mfg. Co.

Chutes and Chute Liners
American Manganese Steel Co.
Bartlett & Snow Co., C. O.
Cross Engineering Co.
Haiss Mfg. Co., Geo.
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Iowa Mfg. Co.
*Jeffrey Mfg. Co.
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McLanahan and Stone Corp.
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*Smidth & Co., F. L.
*Sprout, Waldron & Co.
Taylor-Wharton Iron & Steel Co.

Classifiers
Bradley Pulverizer Co.
*Deister Machine Co.
*Hardinge Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
*Nordberg Mfg. Co.
Simplicity Engr. Co.

Clips (Wire Rope)
*American Steel & Wire Co.
*Leschen & Sons Rope Co., A.
*Roebling's Sons Co., John A.

Clutches
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Sprout, Waldron & Co.

Coal-Pulverizing Equipment
*Allis-Chalmers Mfg. Co.
Bartlett & Snow Co., C. O.
Bradley Pulverizer Co.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.
Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

Compressors (See Air Compressors)

Compressors (Paint Spray)
*Curtis Pneumatic Machy. Co.

Concentrators (Slurry)
*Deister Concentrator Co.

* See also information in the 1937 Pit and Quarry HANDBOOK.

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*Robins Conveying Belt Co.
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*Sprout, Waldron & Co.
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Universal Crusher Co.

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Dracco Corporation

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*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

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*Smidth & Co., F. L.

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Lovejoy Flexible Coupling Co.
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*Chicago Pneumatic Tool Co.
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*Ingersoll-Rand Co.

Cranes (Crawler and Locomotive)
*Austin-Western Road Machy. Co.
*Bay City Shovels, Inc.
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*Koehring Co.
*Lima Locomotive Works
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Marion Steam Shovel Co.
Michigan Power Shovel Co.
Northwest Engr. Co.
Thew Shovel Co.

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*Harnischfeger Corp.

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Frog Switch & Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.
Pettibone-Mulliken Corp.
Taylor-Wharton Iron & Steel Co.
*Traylor Engr. & Mfg. Co.
Universal Crusher Co.
Weaver Mfg. Co.

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Crushers (Hammer)
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*Austin-Western Road Machy. Co.
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Electric Steel Foundry Co.
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*Williams Patent Crusher & Pulverizer Co.

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*Austin-Western Road Machy. Co.
Bacon, Inc., Earle C.
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Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
New Holland Machine Co.
*Nordberg Mfg. Co.
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Smith Engr. Works
*Traylor Engr. & Mfg. Co.
Universal Crusher Co.
Weaver Mfg. Co.

Crushers (Ring)
*American Pulverizer Co.
Bartlett & Snow Co., C. O.
*Williams Patent Crusher & Pulverizer Co.

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*Allis-Chalmers Mfg. Co.
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*Austin-Western Road Machy. Co.
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McLanahan and Stone Corp.
New Holland Machine Co.
*Pioneer Engineering Works, Inc.
*Robins Conveying Belt Co.
Universal Crusher Co.
Weaver Mfg. Co.
*Williams Patent Crusher & Pulverizer Co.

Crushers (Rotary)
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
*Austin-Western Road Machy. Co.
Bartlett & Snow Co., C. O.
New Holland Machine Co.
*Williams Patent Crusher & Pulverizer Co.

Crushing Rolls
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Austin-Western Road Machy. Co.
Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
Sturtevant Mill Co.
*Traylor Engr. & Mfg. Co.
Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

Cutters
American Steel Dredge Co.

Detonators
Atlas Powder Co.
*Hercules Powder Co.

Diaphragms (Rubber)
Quaker City Rubber Co.

Diesel Engines (See Engines—Diesel)

Diggers (Clay)
Independent Pneumatic Tool Co.

Dipper Parts
American Manganese Steel Co.
Frog Switch & Mfg. Co.
Pettibone-Mulliken Corp.
Taylor-Wharton Iron & Steel Co.

Dippers and Teeth (Power Shovel)
American Manganese Steel Co.
*Bucyrus-Erie Co.
Frog Switch & Mfg. Co.
*Koehring Co.
Pettibone-Mulliken Corp.
Taylor-Wharton Iron & Steel Co.

Doors (Car)
Hummel-Foley Corp.

Dragline Cableway Excavators
*Bucyrus-Erie Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

Dragline Excavators
*Austin-Western Road Machy. Co.
*Bay City Shovels, Inc.
*Bucyrus-Erie Co.
*Harnischfeger Corp.
*Koehring Co.
*Lima Locomotive Works, Inc.
*Link-Belt Co.
*Manitowoc Engineering Works
Marion Steam Shovel Co.
Michigan Power Shovel Co.
Northwest Engr. Co.
Thew Shovel Co.

Draglines (Walking)
*Bucyrus-Monighan Co.

Dredges
American Steel Dredge Co.
*Bucyrus-Erie Co.
Hetherington & Berner, Inc.
*Morris Machine Works

Dredges (Hydraulic)
American Steel Dredge Co.

Dredges (Dipper)
American Steel Dredge Co.

Drill Bit Reconditioning
*Bucyrus-Erie Co.

Drill Bits
*Chicago Pneumatic Tool Co.
*Ingersoll-Rand Co.

Drill Sharpening Machinery
Gardner-Denver Co.
*Ingersoll-Rand Co.

Drilling Accessories
*Bucyrus-Erie Co.
*Chicago Pneumatic Tool Co.
Gardner-Denver Co.
Independent Pneumatic Tool Co.
*Ingersoll-Rand Co.
Timken Roller Bearing Co.

Drilling Contractors
Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

Drills (Blast-Hole)
*Bucyrus-Erie Co.
*Chicago Pneumatic Tool Co.
Gardner-Denver Co.
Independent Pneumatic Tool Co.
*Ingersoll-Rand Co.

Drills (Core)
Hoffman Bros Drilling Co.
*Ingersoll-Rand Co.
Pennsylvania Drilling Co.

Drills (Diamond)
*Chicago Pneumatic Tool Co.
Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

Drills (Hand-Hammer)
*Chicago Pneumatic Tool Co.
Gardner-Denver Co.
Independent Pneumatic Tool Co.
*Ingersoll-Rand Co.

Drills (Rock)
*Chicago Pneumatic Tool Co.
Gardner-Denver Co.
*Ingersoll-Rand Co.
*Jeffrey Mfg. Co

Drills (Water Well)
*Bucyrus-Erie Co.

Drill Steel
*Chicago Pneumatic Tool Co.
Independent Pneumatic Tool Co.
*Ingersoll-Rand Co.

Drills (Well) (See Drills—Blast-Hole)

Drives (Multiple, Belt, Chain, Rope)
*Allis-Chalmers Mfg. Co.

Dryers
*Allis-Chalmers Mfg. Co.
*Austin-Western Road Machy. Co.
Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
Sturtevant Mill Co.
*Traylor Engr. & Mfg. Co.
Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

Cutters
American Steel Dredge Co.

Detonators
Atlas Powder Co.
*Hercules Powder Co.

Diaphragms (Rubber)
Quaker City Rubber Co.

Diesel Engines (See Engines—Diesel)

Diggers (Clay)
Independent Pneumatic Tool Co.

Dipper Parts
American Manganese Steel Co.
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Doors (Car)
Hummel-Foley Corp.

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*Link-Belt Co.
*Sauerman Bros., Inc.

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*Bucyrus-Erie Co.
*Harnischfeger Corp.
*Koehring Co.
*Lima Locomotive Works, Inc.
*Link-Belt Co.
*Manitowoc Engineering Works
Marion Steam Shovel Co.
Michigan Power Shovel Co.
Northwest Engr. Co.
Thew Shovel Co.

Draglines (Walking)
*Bucyrus-Monighan Co.

Dredges
American Steel Dredge Co.
*Bucyrus-Erie Co.
Hetherington & Berner, Inc.
*Morris Machine Works

Dredges (Hydraulic)
American Steel Dredge Co.

Dredges (Dipper)
American Steel Dredge Co.

Drill Bit Reconditioning
*Bucyrus-Erie Co.

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*Ingersoll-Rand Co.

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*Ingersoll-Rand Co.

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Independent Pneumatic Tool Co.
*Ingersoll-Rand Co.
Timken Roller Bearing Co.

Drilling Contractors
Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

Drills (Blast-Hole)
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*Chicago Pneumatic Tool Co.
Gardner-Denver Co.
Independent Pneumatic Tool Co.
*Ingersoll-Rand Co.

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*Ingersoll-Rand Co.
Pennsylvania Drilling Co.

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*Chicago Pneumatic Tool Co.
Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

Drills (Hand-Hammer)
*Chicago Pneumatic Tool Co.
Gardner-Denver Co.
Independent Pneumatic Tool Co.
*Ingersoll-Rand Co.

Drills (Rock)
*Chicago Pneumatic Tool Co.
Gardner-Denver Co.
*Ingersoll-Rand Co.
*Jeffrey Mfg. Co

Drills (Water Well)
*Bucyrus-Erie Co.

Drill Steel
*Chicago Pneumatic Tool Co.
Independent Pneumatic Tool Co.
*Ingersoll-Rand Co.

Drills (Well) (See Drills—Blast-Hole)

Drives (Multiple, Belt, Chain, Rope)
*Allis-Chalmers Mfg. Co.

Dryers
*Allis-Chalmers Mfg. Co.
Bartlett & Snow Co., C. O.
*Hardinge Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdry. & Mch. Co.
McLanahan and Stone Corp.
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.

Dust Arresters
Bartlett & Snow Co., C. O.
*Blaw-Knox Co.
Dracco Corporation
*Parsons Engineering Corp.
Schneible Co., Claude B.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Dust Collecting Systems
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
*Blaw-Knox Co.
Dracco Corporation
*Parsons Engineering Corp.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
Schneible Co., Claude B.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Dust Conveying Systems
Allen-Sherman-Hoff Co.
Bartlett & Snow Co., C. O.
*Blaw-Knox Co.
Dracco Corporation
*Fuller Company
*Parsons Engineering Corp.
Schneible Co., Claude B.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp

Dust Filters
*Parsons Engineering Corp.
Schneible Co., Claude B.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp

Dust Handling Systems (Hydro Vacuum)
Allen-Sherman-Hoff Co.

Dynamite (See Explosives)

Electrical Equipment
*Allis-Chalmers Mfg. Co.

Electrodes (Welding)
Stulz-Sickles Co.

Elevator Belting (See Belting)

Elevators (See Conveyors and Elevators)

Eliminators (Soft Stone) (See Soft Stone Eliminators)

Engineers
*Allis-Chalmers Mfg. Co.
Bacon, Inc., Earle C.
Bradley Pulverizer Co.
Cross Engineering Co.
*Fuller Company
Hetherington & Berner, Inc.
Holmes & Bros., Inc., Robt.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
*Smidth & Co., F. L.
*Sprout, Waldron & Co.
Sturtevant Mill Co.
*Traylor Engr. & Mfg. Co.

Engine Generator Sets
See Generator Sets (Engine).

Engines (Diesel)
Caterpillar Tractor Co.
*Chicago Pneumatic Tool Co.
*Cooper-Bessemer Corp.
*Ingersoll-Rand Co.
National Supply Co. of Delaware
*Nordberg Mfg. Co.

Engines (Internal-Combustion)
Caterpillar Tractor Co.
*Chicago Pneumatic Tool Co.
*Cooper-Bessemer Corp.
*Ingersoll-Rand Co.
National Supply Co. of Delaware
*Nordberg Mfg. Co.

Engines (Steam)
*Ingersoll-Rand Co.
*Morris Machine Works
*Nordberg Mfg. Co.

Excavating Machinery (See Shovels; Cranes; Buckets, etc.)

Excavators—Shallow Grading (Bucket Elevator Type)
Haiss Mfg. Co., Geo.

Explosives
Atlas Powder Co.
*Hercules Powder Co.

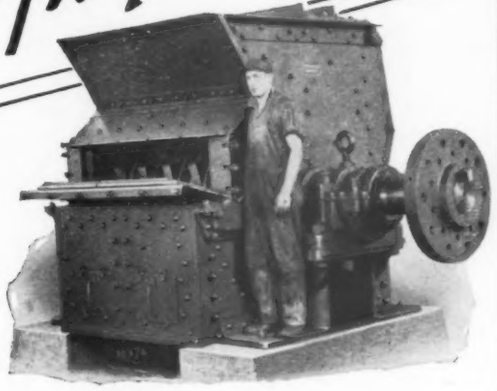
Fabricating (Electric Arc and Oxy-Acetylene)
Smith Co., S. Morgan
Stulz-Sickles Co.

Fans (Exhaust)
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Feeders
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Bartlett & Snow Co., C. O.
Bradley Pulverizer Co.
*Fuller Company
*Hardinge Co.
*Huron Industries Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
*Pioneer Engineering Works, Inc.
*Robins Conveying Belt Co.
Smith Engr. Works

* See also information in the 1937 Pit and Quarry HANDBOOK.

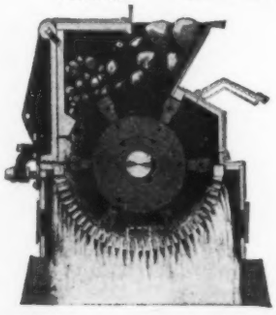
Reduce most Anything



Reduce Costs, Too with JEFFREY Pulverizers and Crushers

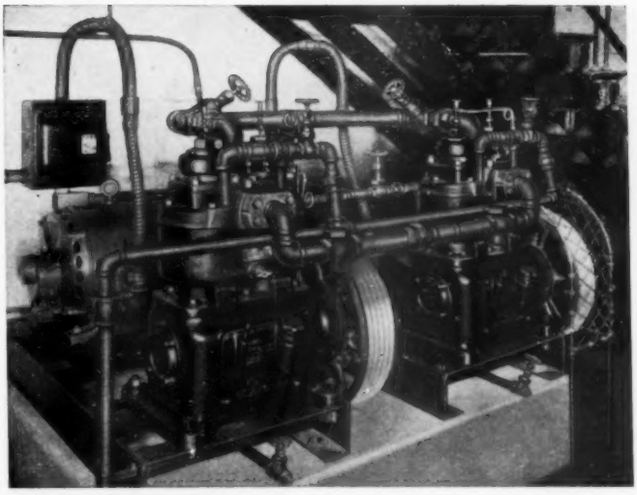
Jeffrey reduction units are successfully reducing asphalt, borax, clay, dolomite rock, fire clay, glue stock, gypsum, iron ore, kaolin, copper ore, carvon, chalk, culm, limestone, marl, mica, macadam, slate, shale, shells, soapstone, terra cotta, magnesite, mineral paints, ochres, oil cake, oyster shells, phosphate rock, salts, slag and many other materials. Not boastingly, but because you should know it . . . we tell you that Jeffrey reduction engineers have had some 44 years of experience in the reduction of many kinds of material . . . particularly those in the non-metallic field. You can rely upon their recommendations . . . you can rest assured that whether it's reduction of material or reduction of operating costs . . . it's all the same to Jeffery engineers.

Patented



Suppose you let us study your reduction problems . . . let us pass some of our broad experience on to you.

The Jeffrey Manufacturing Company
917-99 North Fourth Street, Columbus, Ohio



These distinctive features of CURTIS Model "C" Compressors result in "low-cost air"

Timken Roller Main Bearings . . . Carbon-Free Disc Valves . . . Centro-Ring Oiling . . . Fully Enclosed . . . Precision Made . . . All Parts Readily Accessible . . . 3 to 50 H. P. Sizes

Duplicate medium size CURTIS Compressors, located strategically where air is needed, eliminate long, wasteful air lines and emergency shutdown losses of one large central compressor.

CURTIS AIR HOISTS

Low cost lifting up to 10 tons. Costs no more than chain block. Operator can spot accurately. Abuse-proof. Can't be damaged by overload. Rugged, long-lived.

CURTIS AIR POWER CRANES

Speed production, cut labor costs. Large wheels, roller bearings, unusually easy running. Pressed steel ends. Costs less to buy.

Write for new 26-page booklet on "How Air is Being Used in Your Industry."

CURTIS PNEUMATIC MACHINERY CO.
Established 1854 — 84th Year
1969 Kienlen Avenue, St. Louis, Mo.
NEW YORK • CHICAGO • SAN FRANCISCO

Curtis
COMPRESSORS • AIR HOISTS • I-BEAM CRANES AND TROLLEYS

The Whitcomb Company was born in 1878, and built the first successful power coal-mining machine. In 1906, the first successful locomotive was built. Since then, Whitcomb has developed practical locomotives of many types. They are used in practically every industry and in many countries.

In 1931, Whitcomb joined forces with The Baldwin Locomotive Works, and their products constitute the most extensive locomotive line in the world.

Investigate the advantages of track haulage for your business. Without obligation, our experienced engineers will survey your haulage problem, make impartial recommendations to meet your requirements and estimate the savings to you.

FOUR TYPES OF POWER

Gasoline or Diesel Mechanical Drive
Gasoline or Diesel Electric Drive
Electric Storage Battery
Electric Trolley
Combination Trolley—Storage Battery

THE WHITCOMB LOCOMOTIVE COMPANY
Plant at Rochelle, Illinois
Subsidiary of The Baldwin Locomotive Works. All Sales made by The Baldwin Locomotive Works, Paschall Station Post Office, Philadelphia, Pa.

WHITCOMB LOCOMOTIVES

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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*Sprout, Waldron & Co.
*Traylor Engr. & Mfg. Co.
Universal Crusher Co.

Floor Sweeping Systems (Hydro Vacuum)
Allen-Sherman-Hoff Co.

Forges (Oil)
Gardner-Denver Co.

Fuses (Detonating)
Atlas Powder Co.
*Ensign-Bickford Co.
*Hercules Powder Co.

Gaskets
*Cincinnati Rubber Mfg. Co.
Goodyear Tire & Rubber Co.
Quaker City Rubber Co.
Republic Rubber Co.

Gasoline Engines (See Engines—Internal-Combustion)

Gas Producers
Wellman Engr. Co.

Gates (Bin) (See Bin Gates)

Gates (Clamshell)
Haiss Mfg. Co., Geo.
*Link-Belt Co.

Gears (Herringbone)
Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Sprout, Waldron & Co.

Gears and Pinions
Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Link-Belt Co.
Pettibone-Mulliken Corp.
*Sprout, Waldron & Co.

Gelatin (See Explosives)

Generators (See Motors and Generators)

Generator Sets (Engine)
National Supply Co. of Delaware

Glass Sand Equipment
Lewistown Foundry & Machine Co.

Grab Buckets (See Buckets—Clamshell, Orange - Peel, etc.)

Grapples
Owen Bucket Co.

Grating (Steel)
Bartlett & Snow Co., C. O.
*Blaw-Knox Co.
*Hendrick Mfg. Co.

Grinding Balls (See Balls, Grinding)

Grizzly Feeders
*Jeffrey Mfg. Co.
*Traylor Engr. & Mfg. Co.

Grizzlies
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Bartlett & Snow Co., C. O.
*Eagle Iron Works
*Hendrick Mfg. Co.
*Huron Industries Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdy. & Mach. Co.
Manganese Steel Forge Co.
Pettibone-Mulliken Corp.
*Robins Conveying Belt Co.
Smith Engr. Works

Guards (Wire)
Bartlett & Snow Co., C. O
Manganese Steel Forge Co.
National Wire Cloth Co.

Guns (Hydraulic)
Hetherington & Berner, Inc.
Taylor Forge & Pipe Works

Hammer Mills (See Crushers—Hammer)

Hoists
American Steel Dredge Co.
Bartlett & Snow Co., C. O.
*Chicago Pneumatic Tool Co.
*Curtis Pneumatic Machy. Co.
Gardner-Denver Co.
Hetherington & Berner, Inc.
*Ingersoll-Rand Co.
Iowa Mfg. Co.
*Jaeger Machine Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Pioneer Engineering Works, Inc.
*Sauerman Bros., Inc.
Smith Engr. Works
*Sprout, Waldron & Co.

Hoppers
*Chicago Bridge & Iron Co.
*Hendrick Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.

Hose (Air, Steam and Water)
*Chicago Pneumatic Tool Co.
*Cincinnati Rubber Mfg. Co.
Goodyear Tire & Rubber Co.
Independent Pneumatic Tool Co.
*Ingersoll-Rand Co.
Manhattan Rubber Mfg. Co.
Quaker City Rubber Co.
Republic Rubber Co.

Hose (Fire and Suction)
Quaker City Rubber Co.

Hose (Radiator-Engine Cooling)
Goodyear Tire & Rubber Co.
Quaker City Rubber Co.
Republic Rubber Co.

Hose Couplings (See Couplings)

Hulls (Steel)
American Steel Dredge Co.

Hydraulic Guns (See Guns—Hydraulic)

Idlers
American Manganese Steel Co.
Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.

Joist and Slab Machines (Concrete)
R & L Concrete Machinery Co.

Kilns and Coolers (Rotary)
*Allis-Chalmers Mfg. Co.
Bartlett & Snow Co., C. O.
*Chicago Bridge & Iron Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

Kilns (Vertical)
*Hardinge Co.

Kominuters
*Smidth & Co., F. L.

Ladders
American Steel Dredge Co.

Lime-Handling Equipment
Bartlett & Snow Co., C. O.
*Chicago Bridge & Iron Co.
*Fuller Company
*Hardinge Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Robins Conveying Belt Co.

Lime and Hydrating Plants
*Chicago Bridge & Iron Co.
*Hardinge Co.
Traylor Engr. & Mfg. Co.

Lime Kilns
Bartlett & Snow Co., C. O.
*Chicago Bridge & Iron Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Lime Putty Plants
*Chicago Bridge & Iron Co.

Liners, Car (Paper)
Hummel-Foley Corp.

Linings (Ball- and Tube-Mill) (See Mill Liners and Linings)

Loaders and Unloaders
Bartlett & Snow Co., C. O.
*Bucyrus-Erie Co.
*Fuller Company
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.

Locomotives (Diesel)
*Brookville Locomotive Co.
*Whitcomb Locomotive Co.

Locomotives (Diesel-Electric)
*Whitcomb Locomotive Co.

Locomotives (Electric, Gas, and Steam)
*Brookville Locomotive Co.
*Lima Locomotive Works
*Whitcomb Locomotive Co.

Locomotives (Gas-Electric)
*Whitcomb Locomotive Co.

Locomotives (Oil-Electric)
*Whitcomb Locomotive Co.

Locomotives (Storage Battery)
*Jeffrey Mfg. Co.

Locomotives (Trolley-Battery)
*Jeffrey Mfg. Co.

Magnetic Pulleys (See Pulleys, Magnetic)

Manganese Steel
American Manganese Steel Co.
Frog Switch & Mfg. Co.
Manganese Steel Forge Co.
Pettibone-Mulliken Corp.

* See also information in the 1937 Pit and Quarry HANDBOOK.

Taylor-Wharton Iron & Steel Co.

Manganese Steel Castings
American Manganese Steel Co.
Frog Switch & Mfg. Co.
Pettibone-Mulliken Corp.
Taylor-Wharton Iron & Steel Co.

Manganese Steel (Plates and Sheets)
American Manganese Steel Co.
Manganese Steel Forge Co.

Mechanical Rubber Goods
*Cincinnati Rubber Mfg. Co.
Goodyear Tire & Rubber Co.
Manhattan Rubber Mfg. Co.
Quaker City Rubber Co.
Republic Rubber Co.

Mill Liners and Linings
American Manganese Steel Co.
Bartlett & Snow Co., C. O.
Carnegie-Illinois Steel Corp.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

Mills (Ball, Tube, etc.)
*Allis-Chalmers Mfg. Co.
*Hardinge Co.
*Traylor Engr. & Mfg. Co.

Mills (Grinding) (See also Crushers—Hammer)
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
Bartlett & Snow Co., C. O.
Bradley Pulverizer Co.
Brooks Equipment & Mfg. Co.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdy. & Mch. Co.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Smidth & Co., F. L.
*Sprout, Waldron & Co.
*Traylor Engr. & Mfg. Co.
Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

Mixers
Multiplex Concrete Machinery Co.

Motors and Generators
*Allis-Chalmers Mfg. Co.
*Harnischfeger Corp.

Motors (Internal-Combustion) (See Engines — Internal-Combustion)

Motor Trucks (Dual Rear Axle Drive Units)
Thorntom-Tandem Co.

Moulds and Forms (Concrete)
Dunn Mfg. Co., W. E.
Multiplex Concrete Machinery Co.
R & L Concrete Machinery Co.

Nails
*American Steel & Wire Co.

Netting (Locomotive Stack)
*Tyler Co., W. S.

Nozzles (Gravel Washing)
*Deister Concentrator Co.

Nozzles (Hydraulic) (See Guns—Hydraulic)

Nozzles (Spray)
*Deister Concentrator Co.

Packings
*Cincinnati Rubber Mfg. Co.
Goodyear Tire & Rubber Co
Quaker City Rubber Co.
Republic Rubber Co.

"Paintgrip"
American Rolling Mill Co.

Pallets
Multiplex Concrete Machinery Co.

Partitions (Wire)
National Wire Cloth Co.

Paving Mixers
*Jaeger Machine Co.
*Koehring Co.

Perforated Metal Plates
*Allis-Chalmers Mfg. Co.
Bartlett & Snow Co., C. O.
Chicago Perforating Co.
Cross Engineering Co.
*Hendrick Mfg. Co.
*Sprout, Waldron & Co.

Pipe (Water, Gas, Low Pressure Steam)
American Rolling Mill Co.
Hetherington & Berner, Inc.

Pipe, Dredge (Floating and Shore)
American Rolling Mill Co.
*Chicago Bridge & Iron Co.
Naylor Pipe Co.
Taylor Forge & Pipe Works

Pipe Flanges
American Rolling Mill Co.
Hetherington & Berner, Inc.
Naylor Pipe Co.
Taylor Forge & Pipe Works

Pipe Fittings
American Rolling Mill Co.
Hetherington & Berner, Inc.

Pipe Forms (Concrete)
Concrete Pipe Machy. Co.
Quinn Wire & Iron Works
R & L Concrete Machinery Co.

Pipe Machines (Concrete)
Concrete Pipe Machy. Co.
Quinn Wire & Iron Works
R & L Concrete Machinery Co.

Pipe (Spiral)
American Rolling Mill Co.
Naylor Pipe Co.
Taylor Forge & Pipe Co.

Pipe (Welded)
American Rolling Mill Co.
Naylor Pipe Co.
Taylor Forge & Pipe Co.

Plants (Aggremeter) (See Aggremeter Plants)

Plug Valves (See Valves)

Pneumatic Conveying Systems (See Conveyors—Pneumatic)

Pneumatic Drills (See Drills, Rock)

Portable Conveyors
*Fuller Company
Haiss Mfg. Co., Geo.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Universal Crusher Co.

Portable Crushing and Screening Plants
*Austin-Western Road Machy. Co.
Bartlett & Snow Co., C. O.
*Gruendler Crusher & Pulverizer Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Pioneer Engineering Works, Inc.
Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

Portable Engines (See Engines—Internal Combustion)

Portable Loaders (See Loaders and Unloaders)

Portable Washing Plants
Universal Crusher Co.

Powder, (Black, Blasting) (See Explosives)

Power Cables (Rubber Clad)
*American Steel & Wire Co.

Power Shovels (See Shovels, Electric, Internal-Combustion and Steam)

Power Tampers (Concrete)
Multiplex Concrete Machinery Co.

Precipitators
*Western Precipitation Corp.

Pre-formed Wire Rope
*American Cable Division of the American Chain & Cable Co.
Broderick & Bascom Rope Co.
*Leschen & Sons Rope Co., A.

Press Machines (Hand, Concrete)
Multiplex Concrete Machinery Co.

Proportioning Equipment
*Blaw-Knox Co.
Heltzel Steel Form & Iron Co., The
*Jaeger Machine Co.

Pulleys
*Huron Industries Co.
Sprout, Waldron & Co.

Pulleys (Magnetic)
*Sprout, Waldron & Co.

Pulleys (Wing)
*Sprout, Waldron & Co.

Pulverized Fuel Systems
Bartlett & Snow Co., C. O.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.

Pulverizers (See also Crushers, Mills, etc.)
*American Pulverizer Co.
*Austin-Western Road Machy. Co.
Bartlett & Snow Co., C. O.
Bradley Pulverizer Co.
Brooks Equipment & Mfg. Co.
*Gruendler Crusher & Pulverizer Co.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
New Holland Machine Co.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Smidth & Co., F. L.
Sturtevant Mill Co.
Traylor Engr. & Mfg. Co.
Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

Pump Parts
Peerless Pumps Division of the Food Machy. Corp.
Pettibone-Mulliken Corp.
Taylor-Wharton Iron & Steel Co.

Pump Valves (See Valves, Pump)

Pumps (Air-Lift)
*Chicago Pneumatic Tool Co.
*Fuller Company
*Ingersoll-Rand Co.
Peerless Pumps Division of the Food Machy. Corp.

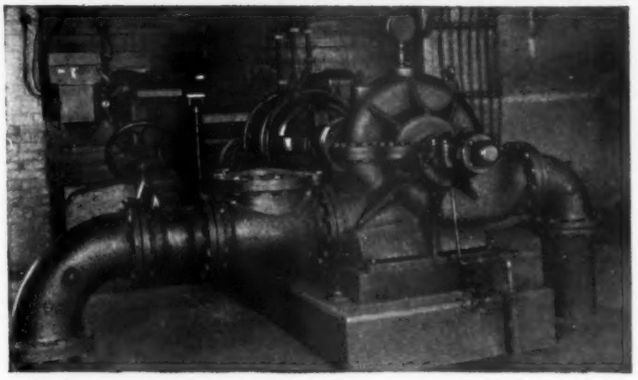
Pumps (Bulk Cement)
*Fuller Company

Pumps (Cement Slurry)
Allen-Sherman-Hoff Co.

* See also information in the 1937 Pit and Quarry HANDBOOK.

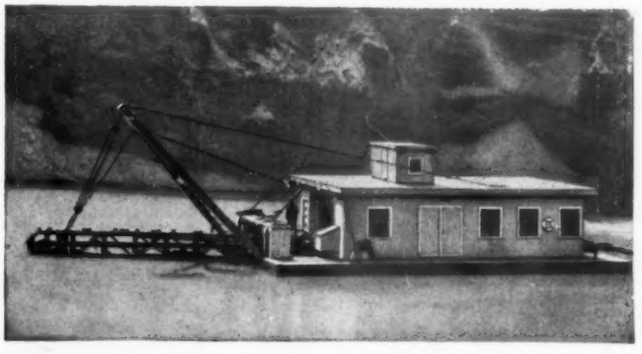
The MORRIS HYDRAULIC COLUMN

News of interest to Centrifugal Pump Users



50% more capacity with the same power! . . . .

A southern plant needed more pumping capacity. The engineer came to Morris for advice. The result . . . a single stage Morris Pump which gave them 50% more water at the same head as from the old two-stage pump, *using the same motor as before.* If you need more capacity, or if your pumping costs are high, investigate Morris designs for your requirements. Seventy-four years of centrifugal pump-building experience makes Morris recommendations authoritative.



Confounding the skeptics . . . .

The favorite job of the Morris Engineers is to prove how often the "impossible" is possible in pumping operations. Many are the instances in which Morris Pumps are developing "impossible" efficiencies, handling "impossible" mixtures, operating under "impossible" conditions, and lasting "impossibly" long. Morris Dredges, too, are successfully solving problems of sand and gravel production which have stumped previous attempts at solution. If you have a difficult pumping or dredging problem, don't give it up, give it to the Morris engineers. They'll give you the answer.

For authoritative recommendations on any pumping or dredging problem, write to Morris Machine Works, Baldwinsville, N. Y. Representatives in Principal Cities.

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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*Morris Machine Works
*Smidth & Co., F. L.

Pumps (Centrifugal)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Erie Pump & Engine Works
Hetherington & Berner, Inc.
Independent Pneumatic Tool Co.
*Ingersoll-Rand Co.
*Jaeger Machine Co.
Kansas City Hay Press Co.
*Morris Machine Works
Peerless Pumps Division of the Food Machy. Corp.
Pettibone-Mulliken Corp.

Pumps (Dredging)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Bucyrus-Erie Co.
Erie Pump & Engine Works
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
*Morris Machine Works
Peerless Pumps Division of the Food Machy. Corp.
Pettibone-Mulliken Corp.

Pumps (Sand and Gravel)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Erie Pump & Engine Works
Hetherington & Berner, Inc.
*Ingersoll-Rand Co.
Kansas City Hay Press Co.
*Morris Machine Works
Peerless Pumps Division of the Food Machy. Corp.
Pettibone-Mulliken Corp.

Pumps (Sump)
*Chicago Pneumatic Tool Co.
*Ingersoll-Rand Co.
Peerless Pumps Division of the Food Machy. Corp.

Pumps (Vacuum)
*Chicago Pneumatic Tool Co.
*Fuller Company
*Ingersoll-Rand Co.

Racks (Curing)
Multiplex Concrete Machinery Co.

Ready-Mixed Concrete Plants
Bartlett & Snow Co., C. O.
Heltzel Steel Form & Iron Co.
*Jaeger Machine Co.

Recuperators
*Manitowoc Engineering Works

Rock Drills (See Drills—Rock)

Rod Mills
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Traylor Engr. & Mfg. Co.

Rods (Welding)
American Manganese Steel Co.
Stulz-Sickles Co.
Taylor-Wharton Iron & Steel Co.

Rope (Wire) (See Wire Rope)

Sand and Gravel Handling Equipment
*Jeffrey Mfg. Co.
*Link-Belt Co.

Sand Separators
Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
*Pioneer Engineering Works, Inc.
Simplicity Engr. Co.
Smith Engr. Works

Sand—Lime—Brick Machinery
*Hardinge Co.

Sand-Settling Tanks
Bartlett & Snow Co., C. O.
*Chicago Bridge & Iron Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Nordberg Mfg. Co.
*Pioneer Engineering Works, Inc.
Smith Engr. Works

Scales
Merrick Scale Mfg. Co.

Scales (Track or Truck)
Merrick Scale Mfg. Co.

Scrapers (Wagon)
*Bucyrus-Erie Co.

Scrapers (Power Drag)
*Austin-Western Road Machy. Co.
Iowa Mfg. Co.
*Link-Belt Co.
*Pioneer Engineering Works, Inc.
*Sauerman Bros., Inc.

Screens
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Bacon, Inc., Earle C.
Bartlett & Snow Co., C. O.
Carnegie-Illinois Steel Corp.
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
Cross Engineering Co.
*Deister Concentrator Co.
*Deister Machine Co.
*Eagle Iron Works
*Gruendler Crusher & Pulverizer Co.
Haiss Mfg. Co., Geo.
*Hardinge Co.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
Ludlow-Saylor Wire Co.
Manganese Steel Forge Co.
McLanahan and Stone Corp.
National Wire Cloth Co.
*Nordberg Mfg. Co.
*Pioneer Engineering Works, Inc.
*Robins Conveying Belt Co.
*Roebling's Sons Co., John A.
Simplicity Engr. Co.
Smith Engr. Works
*Sprout, Waldron & Co.
Sturtevant Mill Co.
Taylor-Wharton Iron & Steel Co.
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.
Universal Crusher Co.
*Universal Vibrating Screen Co.

Screens (Vibrating or Shaking)
*Allis-Chalmers Mfg. Co.
*Austin-Western Road Machy. Co.
Bartlett & Snow Co., C. O.
*Deister Concentrator Co.
*Deister Machine Co.
*Gruendler Crusher & Pulverizer Co.
*Huron Industries Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
*Nordberg Mfg. Co.
*Pioneer Engineering Works, Inc.
*Robins Conveying Belt Co.
Screen Equipment Co.
Simplicity Engr. Co.
Smith Engr. Works
*Sprout, Waldron & Co.
Sturtevant Mill Co.
*Tyler Co., W. S.
Universal Crusher Co.
*Universal Vibrating Screen Co.
*Williams Patent Crusher & Pulverizer Co.

Scrubbers
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.

Seal Rings
*Huron Industries Co.

Separators (Air) (See Air Separators)

Separators (Slurry)
*Smidth & Co., F. L.

Sheaves
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Eagle Iron Works
*Gruendler Crusher & Pulverizer Co.
Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Link-Belt Co.
*Jeffrey Mfg. Co.
McLanahan and Stone Corp.
Pettibone-Mulliken Corp.
*Sprout, Waldron & Co.

Sheets (Galvanized Iron)
American Rolling Mill Co.

Shovels (Electric, Internal-Combustion and Steam)
*Austin-Western Road Machy. Co.
*Bay City Shovels, Inc.
*Bucyrus-Erie Co.
*Harnischfeger Corp.
*Koehring Co.
*Lima Locomotive Works, Inc.
*Link-Belt Co.
*Manitowoc Engineering Works
Marion Steam Shovel Co.
Michigan Power Shovel Co.
Northwest Engr. Co.
Thew Shovel Co.

Silos
*Chicago Bridge & Iron Co.
*Smidth & Co., F. L.

Skip Hoists and Skips
*Allis Chalmers Mfg. Co.
Bartlett & Snow Co., C. O.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Sleeves (Dredge)
*Cincinnati Rubber Mfg. Co.
Quaker City Rubber Co.

Speed Reduction Units
*Huron Industries Co.
Iowa Mfg. Co.
*Link-Belt Co.

Spirals (Lowering)
Holmes & Bros., Inc., Robt.

Spouts (See Chutes and Chute Liners)

Sprays
*Deister Concentrator Co.

Sprockets and Chain
American Manganese Steel Co.
Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Pettibone-Mulliken Corp.
*Sprout, Waldron & Co.

Stabilized Road Mix
*Calcium Chloride Association

Stackers
*Jeffrey Mfg. Co.

Steel (Alloy)
(See Alloys—Steel)

Steel (High Tensile)
American Manganese Steel Co.
American Rolling Mill Co.
Manganese Steel Forge Co.
Pettibone-Mulliken Corp.
Taylor-Wharton Iron & Steel Co.

Steel (Open Hearth)
American Manganese Steel Co.
American Rolling Mill Co.
Manganese Steel Forge Co.
Pettibone-Mulliken Corp.
Taylor-Wharton Iron & Steel Co.

Steel Grating (See Grating, Steel)

Steel Plate Construction
*Chicago Bridge & Iron Co.
Heltzel Steel Form & Iron Co., The
Hetherington & Berner, Inc.
Holmes & Bros., Inc., Robt.
Manganese Steel Forge Co.
*Sprout, Waldron & Co.

Stone Grapples
Owen Bucket Co.

Storage Equipment
Bartlett & Snow Co., C. O.
*Chicago Bridge & Iron Co.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

Surfacers (Concrete)
Independent Pneumatic Tool Co.
*Ingersoll-Rand Co.

Sweeping Systems
Allen-Sherman-Hoff Co.

Tamp Machines (Hand, Concrete)
Multiplex Concrete Machinery Co.

Tanks
Bartlett & Snow Co., C. O.
*Chicago Bridge & Iron Co.
Heltzel Steel Form & Iron Co., The
*Hendrick Mfg. Co.
*Link-Belt Co.
Schneible Co., Claude B.
*Traylor Engr. & Mfg. Co.

Tanks (Dewatering)
Schneible Co., Claude B.

Tanks (Elevated Steel)
*Chicago Bridge & Iron Co.

Tanks (Sand-Settling)
Bartlett & Snow Co., C. O.
*Chicago Bridge & Iron Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Pioneer Engineering Works, Inc.
Smith Engr. Works

Testing Sieves and Shakers
*Hendrick Mfg. Co.
*Tyler Co., W. S.

Thawing Equipment
Aeroil Burner Co.

Thickeners (Slurry)
*Hardinge Co.

Tire Repair Materials
Goodyear Tire & Rubber Co.

Tools (Drill) (See Drilling Accessories)

Torches (Thawing)
Aeroil Burner Co.

Track and Track Material
Taylor-Wharton Iron & Steel Co.

Trac'; Equipment
Pettibone-Mulliken Corp.

Track Shifters
*Nordberg Mfg. Co.

Tractors
*Allis-Chalmers Mfg. Co.
Caterpillar Tractor Co.

Tramways (Aerial)
*American Steel & Wire Co.
*Roebling's Sons Co., John A.

Transformers
*Allis-Chalmers Mfg. Co.

Transmission Belting (See Belting)

Transmission Machinery
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Bartlett & Snow Co., C. O.
*Gruendler Crusher & Pulverizer Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Trippers
Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Trolleys (I-Beam)
*Curtis Pneumatic Machy. Co.

Truck Cranes (See Cranes)

Truck Mixers
Bartlett & Snow Co., C. O.
*Blaw-Knox Co.
*Concrete Transport Mixer Co.
*Jaeger Machine Co.
Ransome Concrete Machy. Co.

Trucks (Hand)
Howe Scale Co.

Trucks and Trailers (See Motor Trucks)

Tube-Mills (See Mills—Ball, Tube, etc.)

Tubes (For Tire Casings)
Goodyear Tire & Rubber Co.
Quaker City Rubber Co.

Turbines
Smith Co., S. Morgan

Underground Loaders
*Allis-Chalmers Mfg. Co.
Bartlett & Snow Co., C. O.

Unloaders (Box Car)
Bartlett & Snow Co., C. O.
*Fuller Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Valves (Pump)
*Cincinnati Rubber Mfg. Co.
Quaker City Rubber Co.
Taylor Forge & Pipe Works

Variable Speed Reducers or Transmissions
*Link-Belt Co.

Vibrating Screen Plate
Bartlett & Snow Co., C. O.
Chicago Perforating Co.
Cross Engineering Co.
*Hendrick Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.

Vibrating Screens (See Screens—Vibrating)

Vibrators
*Ingersoll-Rand Co.
Independent Pneumatic Tool Co.
*Jeffrey Mfg. Co.
*Tyler Co., W. S.

Wagons (Dump)
*Austin-Western Road Machy. Co.
*Koehring Co.
LeTourneau, Inc., R. G.

Washers (Sand, Gravel and Stone)
*Allis-Chalmers Mfg. Co.
*Austin-Western Road Machy. Co.
Bartlett & Snow Co., C. O.
*Eagle Iron Works
Haiss Mfg. Co., Geo.
*Hardinge Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Mach. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
*Pioneer Engineering Works, Inc.
*Smidth & Co., F. L.
Smith Engr. Works
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.
Universal Crusher Co.

Weighing Equipment (Automatic)
*Blaw-Knox Co.
*Fuller Co.
Heltzel Steel Form & Iron Co., The
*Jaeger Machine Co.
Merrick Scale Mfg. Co.

Welding Bars, Wedge and Applicator (Nickel - Manganese Steel)
Stulz-Sickles Co.
Taylor-Wharton Iron & Steel Co.

Welding and Cutting Equipment
Smith Company, S. Morgan
Stulz-Sickles Co.

Welding Rods
American Manganese Steel Co.
Bradley Pulverizer Co.
Stulz-Sickles Co.
Taylor-Wharton Iron & Steel Co.

*See also information in the 1937 Pit and Quarry HANDBOOK.

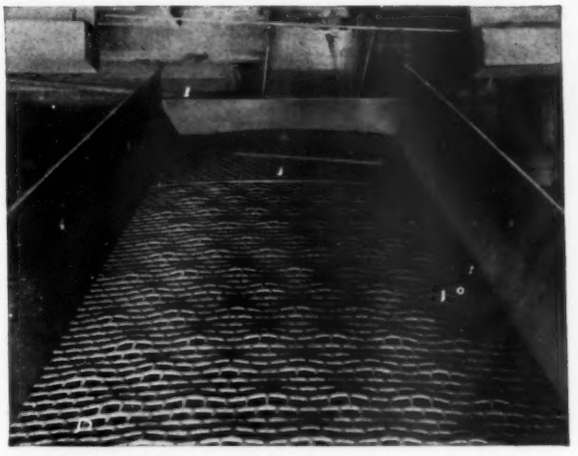
SOLVE YOUR CRUSHING AND SCREENING PROBLEMS with these dependable

Hendrick Products

PERFORATED PLATE, recognized as the superior medium for vibrating, revolving and shaking screens . . . is available from Hendrick in any shape of perforation — round, square, hexagonal, slotted, Squa-round*, as well as special openings — furnished flat, or rolled to any degree of curvature. Available in any commercially-rolled metal. For particularly severe screening jobs we recommend Hendrick high-carbon, heat-treated, double-corrugated plate.

ELEVATOR BUCKETS . . . the kind that "stay on the line" the longest—in all sizes, in various capacities from a fraction of a

*Reg. U. S. Pat. Office



cubic foot to several cubic feet . . . they're made to suit YOUR specifications.

TESTING SCREENS . . . A type to suit your every testing requirement from the rugged Weston Testing Screen—made to dependable Hendrick standards.

HENDRICK MANUFACTURING CO.

39 Dundaff Street, Carbondale, Pa.

Sales Offices in Principal Cities. Please Consult Telephone Directory

Makers of Elevator Buckets of all types, Mitco Open Steel Flooring, Mitco Shur-Site Treads and Mitco Armorgrids. Light and Heavy Steel Plate Construction.

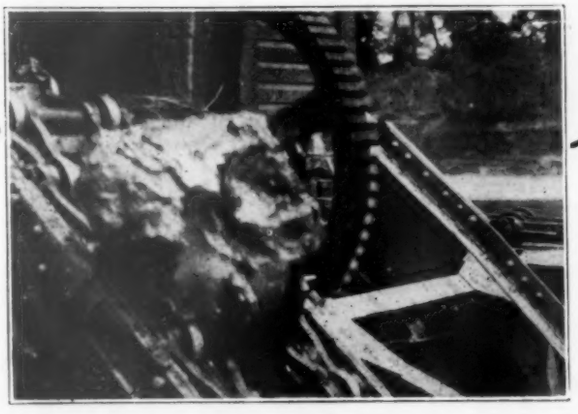
EAGLE "SWINTEK"

SCREEN NOZZLE LADDER

Eliminates costly delays and irregular production due to suction line becoming clogged with boulders or debris from the deposit. Speed up production and incidentally *boost your profits* with the EAGLE "SWINTEK" NOZZLE LADDER. It insures an even flow of solids by loosening and agitating the deposit with a screen chain which also carries away everything that might otherwise clog the nozzle.

The EAGLE "SWINTEK" NOZZLE LADDER means CONTINUOUS OPERATION — GREATER OUTPUT — MORE PROFIT! Full information on request.

EAGLE IRON WORKS • DES MOINES, IOWA



FOR CLEAN SAND AND GRAVEL USE EAGLE WASHERS

SEND FOR EAGLE "SWINTEK" AND WASHER BULLETIN

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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Welding Service
Smith Co., S. Morgan
Stulz-Sickles Co.

Welding Supplies
American Manganese Steel Co.
*American Steel & Wire Co.
*Harnischfeger Corp.
Manganese Steel Forge Co.
*Roebling's Sons Co., John A.
Stulz-Sickles Co.
Taylor-Wharton Iron & Steel Co.

Well Drills (See Drills—Well)

Wheels (Car)
American Manganese Steel Co.
***Eagle Iron Works**
Iowa Mfg. Co.
Pettibone -Mulliken Corp.
Taylor-Wharton Iron & Steel Co.

Wheel Rims. See Rims—Wheel

Winches and Capstans
***Jeffrey Mfg. Co.**
***Link-Belt Co.**
***Robins Conveying Belt Co.**
*Sprout, Waldron & Co.

Wire and Cable (Electric)
*American Steel & Wire Co.
*Roebling's Sons Co., John A.

Wire Cloth
Cleveland Wire Cloth & Mfg Co.
Ludlow-Saylor Wire Co.
Manganese Steel Forge Co.
National Wire Cloth Co.
***Robins Conveying Belt Co.**
*Roebling's Sons Co., John A.
Taylor-Wharton Iron & Steel Co.
Tyler Co., W. S.

Wire Rope
*American Cable Division of the American Chain & Cable Co., Inc.
*American Steel & Wire Co.
Broderick & Bascom Rope Co.
*Leschen & Sons Rope Co., A.
*Roebling's Sons Co., John A.

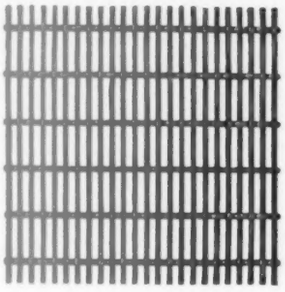
Wire Rope Fittings
*American Cable Division of the American Chain & Cable Co., Inc.
*American Steel & Wire Co.
Broderick & Bascom Rope Co.
*Leschen & Sons Wire Rope Co., A.
*Roebling's Sons Co., John A.

Wire Rope Slings
*American Cable Division of the American Chain & Cable Co., Inc.
*American Steel & Wire Co.
Broderick & Bascom Rope Co.
*Leschen & Sons Rope Co., A.
*Roebling's Sons Co., John A.

Wire (Welding)
American Manganese Steel Co.
*American Steel & Wire Co.
Manganese Steel Forge Co.
*Roebling's Sons Co., John A.
Taylor-Wharton Iron & Steel Co.

Worm Gears (See Gears and Pinions)

* See also information in the 1937 Pit and Quarry HANDBOOK



Rolled Slot

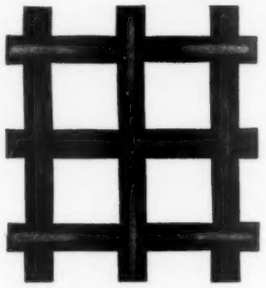
ALLOY No. 2

A super wearing Steel developed to resist the abrasion and vibration of modern screening demands.

"CLEVELAND" SCREENS

A wire cloth of guaranteed accuracy backed by fine workmanship and an effort to satisfy.

Available in Square Mesh and Rolled Slot. A trial will convince you of the superiority.



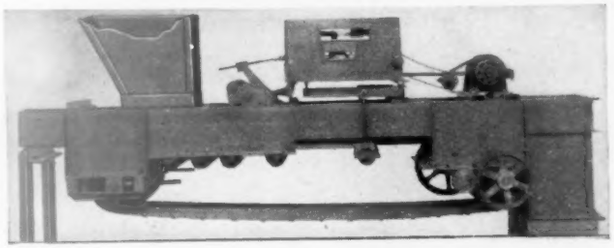
2 Mesh .162 Ga.

THE CLEVELAND WIRE CLOTH & MFG. COMPANY
574 E. 78th St. CLEVELAND, OHIO

Weigh your Bulk Materials *"on the move"*

Successful operators insist upon the
WEIGHTOMETER and FEEDOWEIGHT
Some have more than 20 installations

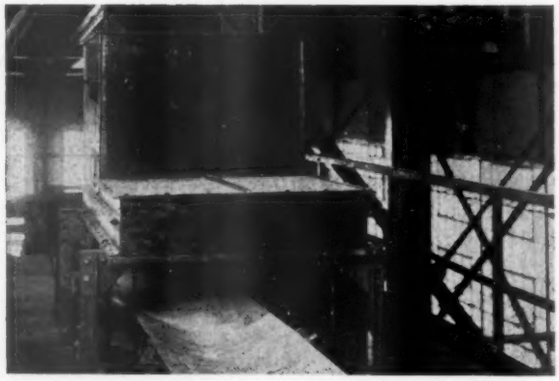
THE MERRICK FEED-O-WEIGHT



This MERRICK automatically feeds material by weight. It weighs, totals and registers the material fed. May be applied to existing belt feeders.

Thd FEED-O-WEIGHT is equipped with a power operated feed and control gate, allowing the beam of the scale to always freely assume its true position of equilibrium—a unique feature of FEED-O-WEIGHT and essential to accurate operation.

Use FEED-O-WEIGHT for proportioning Raw Mix—Limestone & Shale—Clinker & Gypsum.



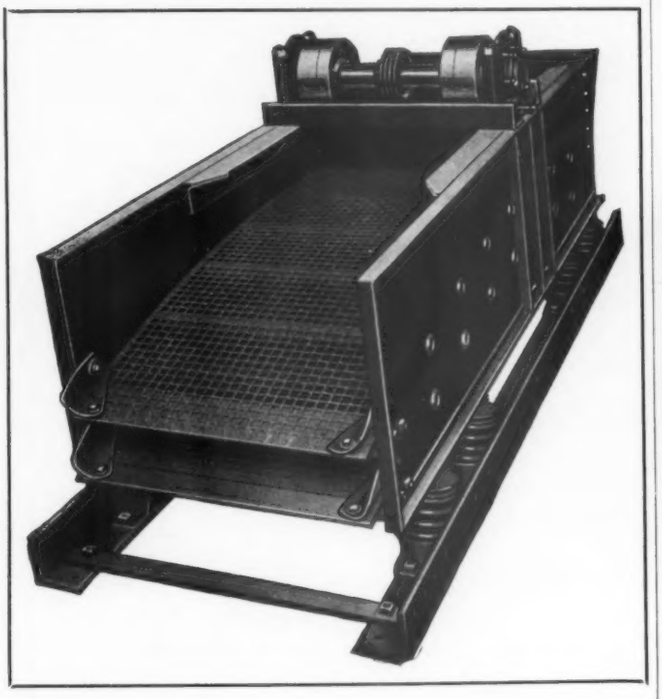
INSTALLATION OF MERRICK WEIGHTOMETER

MERRICK installations all over the WORLD give accurate production figures at minimum expense. You too can depend on a MERRICK and make substantial savings by a constant check-up on tonnage produced and shipped.

MERRICK SCALE MFG. COMPANY
PASSAIC NEW JERSEY

MERRICK CONVEYOR WEIGHTOMETER

DEISTER PLAT-O VIBRATING SCREEN



The soundly engineered application of the unbalanced flywheel type of vibrating mechanism, **as used in the PLAT-O VIBRATING SCREEN,** has eliminated the use of eccentric shafts with their multiplicity of bearings and excessive costs in labor and material for replacements. The rugged, heavy Plat-O Vibrating Mechanism—heart of the Plat-O Screen—revolves in **only two** oversize SKF self-aligning spherical roller bearings. Repairs?? Plat-O Screens are gluttons for punishment. Ask any Plat-O user.

1. Extra rugged construction
2. Free from bearing trouble
3. Adjustable vibration or throw
4. High speed eliminates blinding
5. Spring mounted, no vibration to supporting structure
6. Oil lubrication, no grease
7. Combined sifting and vibrating action means high capacity
8. Ideal for medium or coarse screening
9. Flat screening angle and minimum headroom
10. Long screen cloth life, no whipping
11. Screen cloths easily changed
12. NO ECCENTRICS, FEWER BEARINGS AND FEWER REPAIRS

Examine them point by point—check and double check every advanced feature—and then you will see why PLAT-O SCREENS stand the "acid test" of hard service.

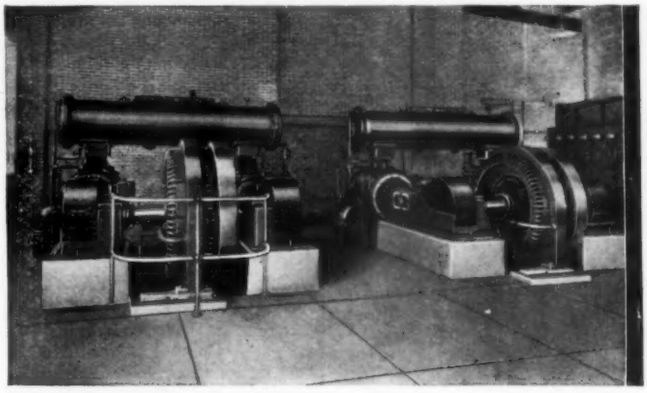
DEISTER MACHINE CO.

1933 E. Wayne Street Fort Wayne, Ind.

Emil Deister, Sr., Pres.; I. F. Deister, V. Pres.
Emil Deister, Jr., Secy.-Treas.

CP STATIONARY AIR OR GAS COMPRESSORS

Single and two-stage designs; belt, direct-connected motor and steam drive; capacities up to 10,000 c.f.m.; special sizes also available.



Two CP Class O Air Compressors installed by a prominent cement company. Upon the basis of their outstanding performance, another CP Air Compressor of the same class has since been installed in the same plant.

noted for "repeat orders" **Compressors that consistently earn the endorsement of "repeat" orders are the compressors that can . . . and will . . . deliver the lengthy, reliable, low cost service you seek.**

CP Class O Compressors are noted for their record of "repeat" orders. Let us quote from that record . . . along with the interesting details of design, construction and operation given in Bulletins No. 724 and 725.

CHICAGO PNEUMATIC TOOL COMPANY

Sales and Service Branches All Over the World

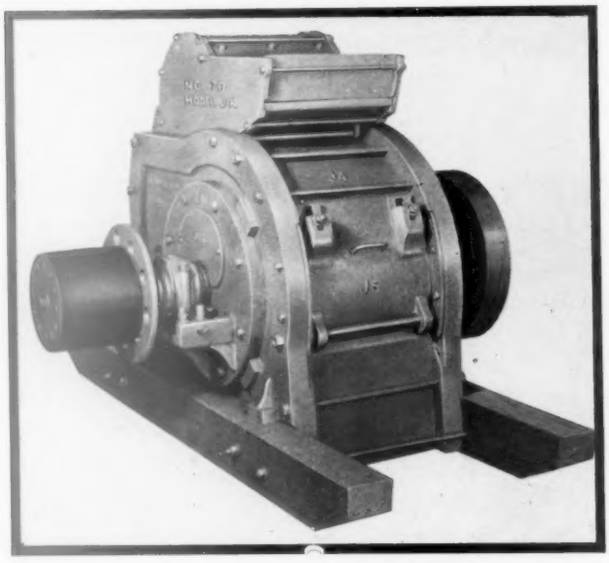
6 EAST 44th STREET • NEW YORK, N. Y.

AIR & GAS COMPRESSORS • ROCK DRILLS
DIAMOND CORE DRILLS • DIESEL ENGINES
ELECTRIC TOOLS • PNEUMATIC TOOLS
VACUUM PUMPS & CONDENSERS
OIL WELL ROCK BITS, REAMERS & TOOL JOINTS

CHICAGO PNEUMATIC

C-7-37

This BRUTE
is a MONEY-MAKER



And You Can Produce all sizes in a DAY

Since 1914 . . . building pulverizing and crushing machinery exclusively and continuously. Yes, we ought to know—and we do—what your demands are for satisfactory production in crushing machinery. This is the reason those who operate DAY pulverizers and crushers will tell you these machines are built for brutal service . . . yes, for long years of hard punching.

The simple, foolproof design of the DAY is one of its most valued features. Quick, easy adjustments for various sizes of materials, make the DAY swing hammer pulverizer a universal machine for producing either finely ground agricultural lime, small aggregate or course road stone and similar materials. Write or wire now for completely illustrated matter and details.

You Can't
Go Wrong
In A DAY

BROOKS EQUIPMENT & MFG. CO.
KNOXVILLE TENNESSEE

THERE MUST BE A REASON
FOR
CONTINUED POPULARITY

For nearly nine years Pit and Quarry has led all other papers in this field in subscriptions among producers. It is the most popular paper—with its popularity constantly growing, as is shown by the increasing number of subscriptions and the increasing margin of lead.

The reason? At no time has Pit and Quarry compromised with its high editorial standards. It has held its editorial staff, and kept its field editor on the road, wearing out a car in one to two years. The illustrations have always been plentiful, the articles easy to read.

Costly to do this? Yes, it is. But it has been worth the cost, for producers realize that Pit and Quarry has worked *with* them. Savings effected by change from biweekly to monthly publication have been passed on in the form of a reduced subscription price—not pocketed. And the high percentage of subscribers who renew their subscription attests their loyalty to a publication understanding their problems and working *with* them.

The subscription price is still only one dollar for a full year's service. If you are not already a subscriber, why not send in a dollar and learn why other producers find Pit and Quarry so valuable? The cost is so small—the results so large—don't delay.

Return This Coupon To-day—Start Your Subscription with the February Issue.

PIT AND QUARRY PUBLICATIONS,
538 So. Clark Street, Chicago, Illinois.

Inclosed find remittance for which enter my subscription to Pit and Quarry for 1 year ($1.00)..... starting with the *February* issue. (Foreign add $1.00 per year.)

My Name..... Title.....

Company Name .....

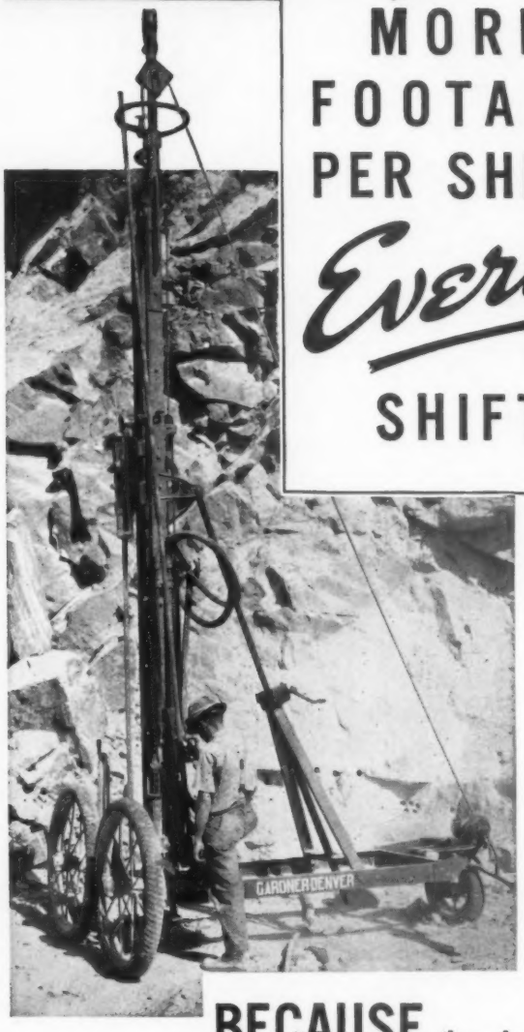
Send to (Address).....

We Produce .....

RESULTS

IN ROCK DRILLING MEAN JUST 1 THING

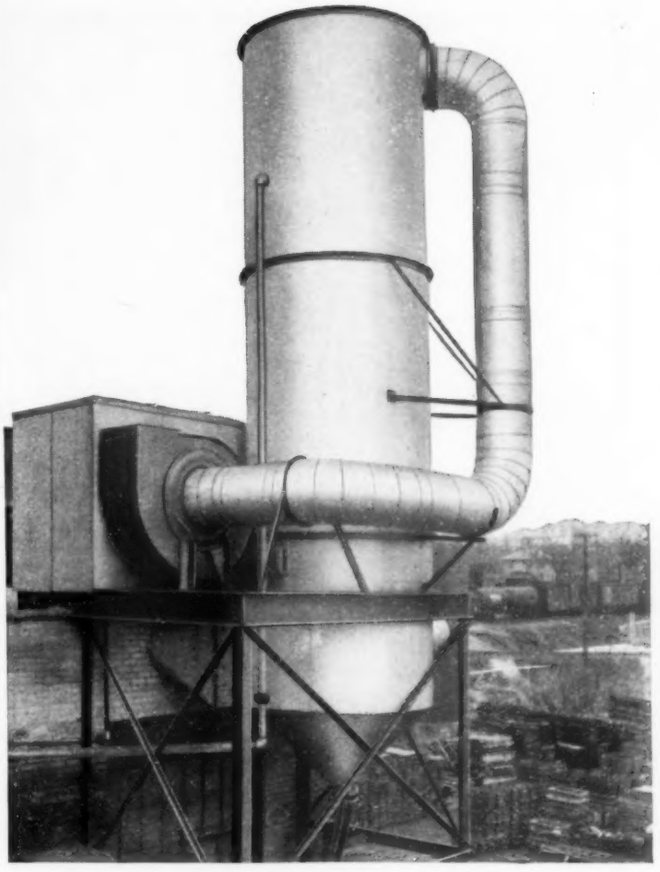
MORE FOOTAGE PER SHIFT *Every* SHIFT



BECAUSE they handle 12-foot steel changes—are easy to move—have maximum hole-cleaning efficiency and are adjustable from vertical to horizontal . . . Gardner-Denver WDS Wagon Drills get the **RESULTS** you want.

GARDNER-DENVER COMPANY
Quincy, Illinois • Since 1859

GARDNER-DENVER
MORE FOOTAGE PER SHIFT—EVERY SHIFT



for every dust problem —

SCHNEIBLE MULTI-WASH DUST COLLECTORS!

Simple and highly efficient—

Nothing to break, wear or burn—

No pockets or dead zones—

No nozzles, spray heads or moving parts—

Unaffected by heat, cold or moisture — *non-freezing* —

Guaranteed against repair or maintenance for 5 years.

Send for Bulletin No. 110—Do it today!

CLAUDE B. SCHNEIBLE COMPANY
3951 Lawrence Avenue, Chicago, Illinois

Offices in New York, Springfield, Mass., Pittsburgh, Philadelphia, Buffalo, Cleveland, Detroit, Milwaukee, St. Louis, Denver, Salt Lake City, Los Angeles, Oakland, Seattle, and Honolulu, T. H.

THE 21st ANNUAL CONVENTION

OF THE

NATIONAL CRUSHED STONE ASSOCIATION

Offers to Crushed Stone Producers a Program of Exceptional Merit

Included among the topics scheduled for discussion are the following:

What is the Future of Private Enterprise?

Diesel Power in the Crushed Stone Industry

The Correlation of the Los Angeles Rattler Test and Service Behavior

Labor Relations in the Crushed Stone Industry

Federal Wage and Hour Legislation

Many other subjects of equal interest will appear on the program—all will be presented by men outstanding in their fields. The Manufacturers' Division Exposition will be the largest and most comprehensive held in recent years—this feature alone well warrants attendance.

Plan now to be present at the Netherland Plaza Hotel, Cincinnati, Ohio, on January 24, 25 and 26, 1938, for the most important event of the year to crushed stone producers.

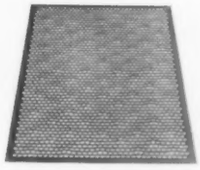
CROSS

PERFORATED PLATES AND SECTIONS

FOR ALL TYPES OF SCREENS

OUTSTANDING QUALITY *DEPENDABLE SERVICE*

CROSS SPECIAL ANALYSIS SCREEN STEEL



Vibrating

Cylinder and Cone

Vibrating

Note the clean, tapered walls of Cross Perforations, without burrs on under side. Steel correctly perforated in this manner is not weakened or cracked, giving long wear and faultless performance.

CROSS ENGINEERING CO.

MAIN OFFICE & MFG. PLANT, CARBONDALE, PA.

Sales Representatives In Principal Cities

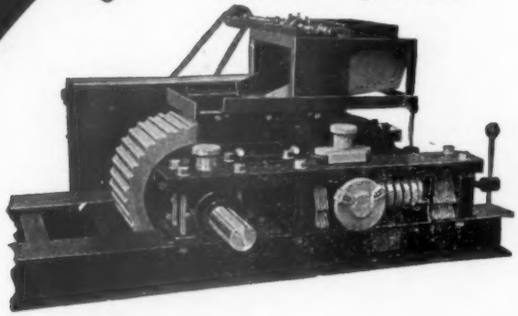
START 1938 with the Efficiency of

NEW HOLLAND

CRUSHERS AND SCREENS

The "Circle Throw" feature that insures positive, uniform vibration to every part of the screening area in New Holland Screens—and the Pulsating Feeder of the New Holland Roll Crusher that gives double capacity—these are just a few of the advanced types of design in New Holland equipment, which will help you reduce your production costs on next year's jobs. Write for bulletins.

Latest model of Roll Crusher for chips, sand and road making materials. Full range of sizes.



Heavy Duty Vibrating Screen built in one, two and three deck types. Available in various capacities for rapid uniform sizing.

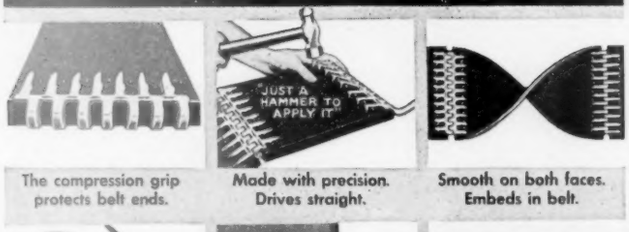
NEW HOLLAND MACHINE CO.

P. O. Box 200 New Holland, Pa.

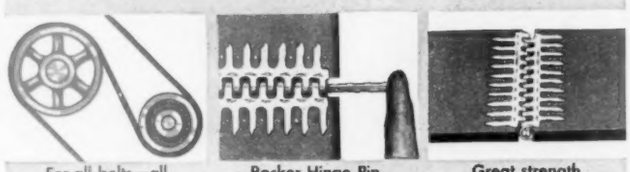
ALLIGATOR

TRADE MARK REG. U.S. PAT. OFFICE

STEEL BELT LACING



The compression grip protects belt ends. | Made with precision. Drives straight. | Smooth on both faces. Embeds in belt.



For all belts—all speeds. Flexible. | Rocker Hinge Pin. Separable joint. | Great strength. Long life.

"Never Lets Go"

12 Sizes in Standard Boxes.

Made also in "Monel Metal" and non-magnetic alloy for special service, and in long lengths for wider belts.

Sole Manufacturers

FLEXIBLE STEEL LACING CO.

4623 Lexington Street Chicago, Illinois

In England at 135 Finsbury Pavement, London, E. C. 2

Welding of Large Pieces by

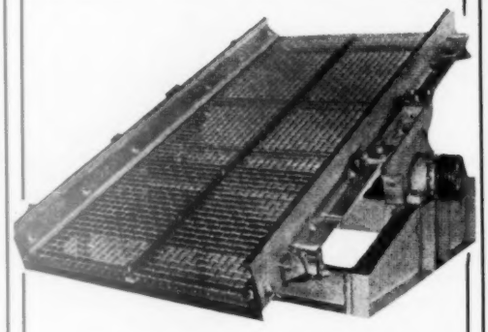
Get this Bulletin

WRITE us, if you have heavy welding to be done, so we can explain how efficiently we can serve you. It's a Service backed by experience in welding extremely large units, in completely modern shops.

S. MORGAN SMITH CO.

YORK, PA.

HURON



SCREENS

Start 1938 with the economies that go with Huron HEAVY DUTY Screens. The SKF Brute Bearings, Quick cloth change, and Deck Slope Adjustment are all factors in low maintenance as well as time saving features.

There is a type and size of screen in the complete Huron line for your every requirement. Write for information and prices.

HURON INDUSTRIES CO.

Alpena, Michigan

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Every month occasional readers decide to make the reading of PIT AND QUARRY a regular habit and so the list of paid subscribers grows. Why not make the same decision for yourself today and have the copies addressed to you personally? As an added means of preventing delay in receiving their copies many executives have PIT AND QUARRY sent to their homes, where it can be read at leisure and in comfort.

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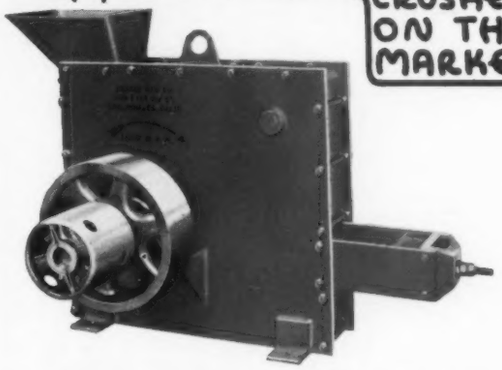
"I CRUSH MORE MATERIAL PER HOUR (FROM FEED SIZE TO 95% ½ INCH MINUS) WITH LESS POWER INPUT THAN ANY OTHER CRUSHER ON THE MARKET!"



WEAVER *Impact* CRUSHER

This rugged new Impact Crusher, which is adaptable to practically all classes of material, means low first cost, low maintenance cost, and low power cost. In addition, it provides continuous operation — no wonder it's the World Champion Economy Crusher! 3 sizes — 5, 15, and 40 tons per hour. Prices on request.

May Be Seen At

WEAVER MFG. CO.

1639 East 102nd St. Los Angeles, Cal.

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WHAT DOES EVERY MANUFACTURER SEEK?

SATISFIED customers . . . The life-line of every successful business. Satisfaction is the common possession of UNIVERSAL users, for EACH YEAR 40 to 50% of UNIVERSAL SCREENS ARE SHIPPED ON REPEAT ORDERS!

The Most Efficient and Dependable Vibrating Screens — priced at $296 and up.

Complete Catalog sent on request.

UNIVERSAL VIBRATING SCREEN CO.

RACINE — WISCONSIN

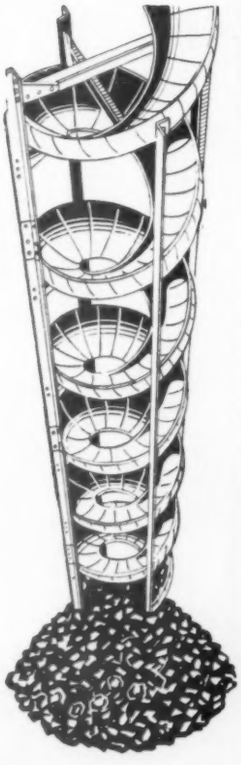
Do Two Jobs in One..

1 CONVEY MATERIALS

2 MIX IT

Material can be lowered and piled and mixed at the same time with Holmes Lowering Spirals. As the material slides gently around the spirals to the bottom, any two or more sizes of material may be evenly deposited to prevent segregation.

Every installation of spirals is tailor-made for the particular job. That's why it works so well wherever it is used. Let our engineers consult with you.



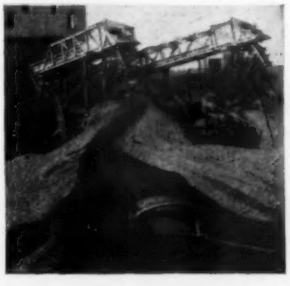
Robert Holmes & Bros.

Incorporated

DANVILLE ILLINOIS

Above is a typical set-up of a Sauerman Slackline Excavator. Material is lifted from under water to top of plant in one movement.

Below is Sauerman Drag Scraper stockpiling surplus output of screened material at large plant.



SAUERMAN

LONG RANGE MACHINES

POWERFUL, economical machines are these Sauerman Drag Scrapers and Slackline Excavators. They are able to span an area 1,000 ft. or more in width and convey materials from any point in this area at a rapid rate. One man handles the entire operation.

The sizes of Sauerman machines range from portable units for small pit operations up to huge machines with capacities in excess of 500 cu. yd. per hour. There is a special type for underwater excavation, another for digging from a bank, another for storing and reclaiming, and so on.

Tell us your problem and we will mail you a booklet describing the type of machine that meets your requirements.

See the Sauerman exhibits at the ROAD SHOW and at the SAND & GRAVEL EXPOSITION

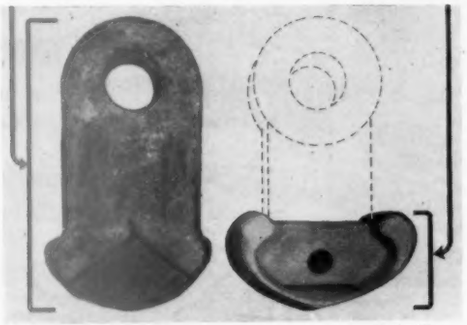
●

SAUERMAN BROS.

434 S. Clinton St. CHICAGO

DO YOU THROW AWAY

THIS - - - or - - - THIS



55 lbs. - - - or - - - 15 lbs.

when you replace your hammers

Let us tell you the savings effected by using

ESCO RENEWABLE HEAD HAMMERS

These hammers have been used by several leading cement mills on the Pacific Coast for several years with complete success. Write today.

Patented

ELECTRIC STEEL FOUNDRY CO.

Portland, Oregon

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OLD TIME GRAIN DOORS *Replaced*

The new H-F Dunnage Door is a light, leakproof super fibre, reinforced with wood, and weighing only 35 lbs. It has a puncture resistance of 400 lbs. to the inch. Scores of leading shippers have adopted it as the standard protection from rain, spillage, and waste of labor and freight costs. A remarkably economical method, it has passed every known test for dependable service. Write us for prices and our liberal test offer.

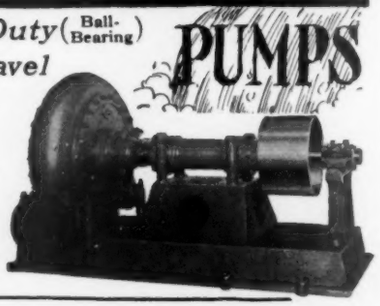
HUMMEL-FOLEY CORP. HOPEWELL, VIRGINIA

***The* H-F DUNNAGE DOOR**

LIGHTNING

Heavy-Duty (Ball-Bearing) *Sand and Gravel* **PUMPS**

High efficiency — low operating cost—precision workmanship — wear-resisting, non-heating bearings even when operated under extremely high heads. WRITE



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DETROIT'S *Outstanding* **HOTEL VALUE**

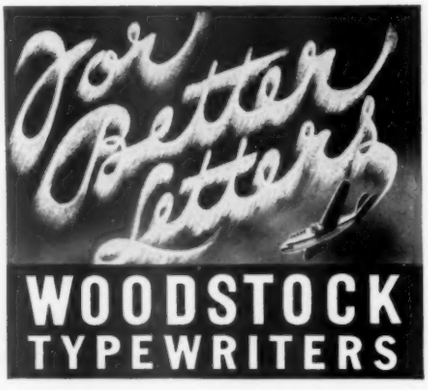
Large rooms tastefully furnished to insure solid comfort – in a location that can't be beat for convenience – at rates which are surprisingly economical.

HOTEL BARLUM

810 OUTSIDE ROOMS

FROM $2.50 EACH WITH BATH AND SHOWER

CADILLAC SQUARE AT BATES STREET



Advertise your wants and surplus equipment in

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11 to 13½% Nickel Manganese Steel

U. S. Patents 1,876,738, 1,947,167 and 2,021,945.

Welding Electrodes, Applicator and Wedge Bars

for **Reclaiming 11 to 14% Manganese Steel Parts.**

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HEAVY DUTY DRYERS Rotary Type

DIRECT FIRED SINGLE SHELL *and* INDIRECT-DIRECT HEAT DOUBLE SHELL

ASK WHAT WE HAVE DONE FOR OTHERS

The C. O. BARTLETT & SNOW Co.

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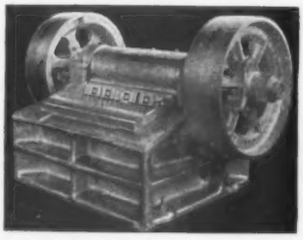
"CEDAR RAPIDS" ROLLER BEARING CRUSHER

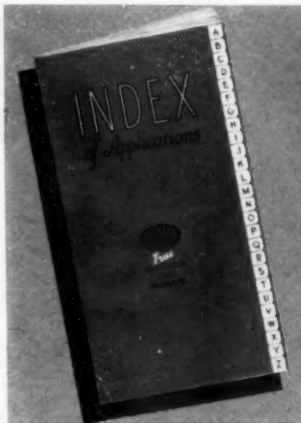
Saves 90% On Lubrication Costs



Positive new seal keeps dirt out and grease in. Relubrication required only **once** in six months. SKF spherical self-aligning roller bearings reduce maintenance costs. Increases bearing life and eliminates failures due to overload. Main castings are electric cast annealed steel. Dependable. Durable. Economical. Many sizes. Write for bulletin.

IOWA MANUFACTURING CO.

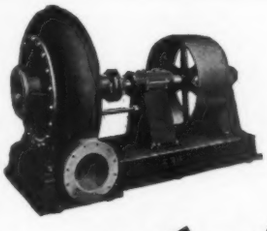
Cedar Rapids, Iowa



ROL-MAN

Rol-Man Rolled, True (11% to 14%) Manganese Steel has practically double the strength and abrasion resistance of cast manganese steel, ten times the "effective strength" of mild steel and three and a half times that of heat treated nickel steel. Send for this 32 page catalog No. 3R. No obligation.

MANGANESE STEEL FORGE CO. • Castor Ave. & Allen St. • PHILADELPHIA



Foremost for 45 years

ERIE Dredge Pumps

100% Pump Performance

achieved by the use of super-wear alloy steel and the rugged construction of every detail part. Write for Bulletin.

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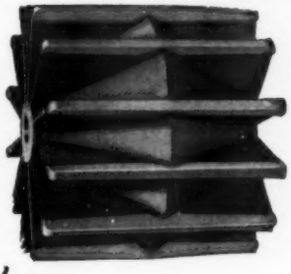
MEDINA, NEW YORK



CONVEYORS LAST LONGER

where SPROUT-WALDRON Wing Pulleys are used. The same is true of your Elevator belts.

Material conveyed cannot lodge between belt and pulley to cut your belts.

Interchangeable with standard pulleys.

Write for catalog

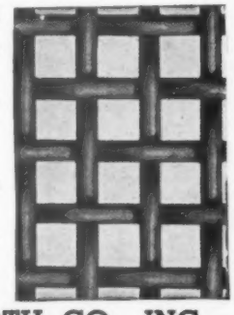
SPROUT, WALDRON & CO., INC.

1221 SHERMAN ST., MUNCY, PA.

Elevating, Conveying and Transmission Equipment

FIVE STAR FEATURES

of Nat-aloy Wire Cloth



- ★ Wears five to ten times as long as cloth made of ordinary steel
- ★ Withstands vibration without crystallization
- ★ Super-tough to resist abrasion
- ★ Maintains accuracy throughout life of screen
- ★ Economical in price and serviceability

Attractive Prices
Immediate Shipments from Stock

NATIONAL WIRE CLOTH CO., INC.

St. Paul, Minn. Write for new catalog No. 36.

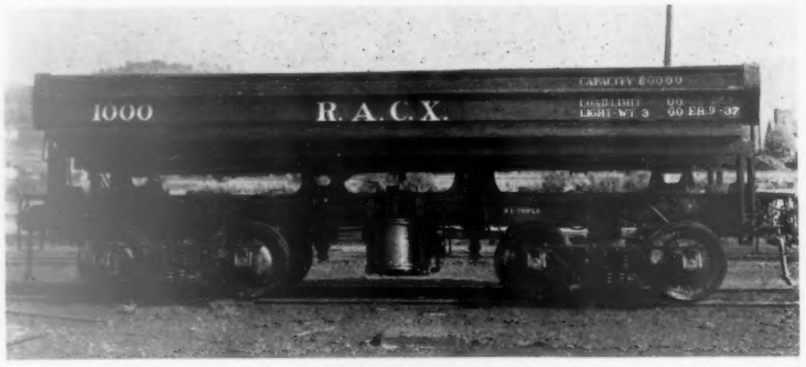
Lewistown Foundry Products ARE

Performance-Tested

BUCKET ELEVATORS
REVOLVING SCREENS
CRUSHERS DRY PANS

Lewistown Foundry & Machine Co.

Lewistown, Pa.



FOR SALE

20-Kilbourne & Jacobs 16 cu. Yard air operated Dump Cars, fully rebuilt and available for immediate inspection and delivery, quotations and prints gladly furnished.

RAILWAY ACCESSORIES COMPANY, 3408 Carew Tower, Cincinnati, Ohio

EQUIPMENT FOR SALE CHEAP

1—Vulcan 40 ton Std. Ga. Saddle tank locomotive.
1—Marion 1 yd. Steam crane 40′ boom on cats.
1—Russell Grader, 10′ Blade.
1—Link-Belt K-30 Trench Hoe, 45′ Boom.
1—Link-Belt K-44 shovel 50′ boom, fairleads.
1—Lorain 75 B 1¼ yd. chain crowd shovel.
2—Whitcomb 12 Ton 36″ Gauge Locomotives.
2—C. P. Compressors, 590 cu. ft., 100 h.p. mtr.
2—Worthington Compressors, 621 cu. ft., 75 H. P. motor
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1—Sullivan 310′ portable compressor.
1—Ingersoll-Rand pavement breaker.
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1—1 yd. Owen Bucket.
1—1 yd. Kiesler rehandling bucket.
1—¾ yd. Browning clamshell bucket.
1—¾ yd. Blaw-Knox bucket.
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1—Morris 8″ dredge pump 150 HP. GE. mtr.
1—Morris 10″ cent. pump 2250 GPM at 130′ head.
1—Goulds 12″ cent. pump 50 HP. GE. motor.
1—Thompson 6″ self priming pump Waukesha moto
2—Gardner Denver Sheeting Hammers.
2—Humdinger 6″ self priming pumps, gas motor.
1—Humdinger 4″ self priming pump.
1—Humdinger 2″ self priming pump.
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1—Browning Truck crane.

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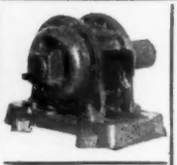

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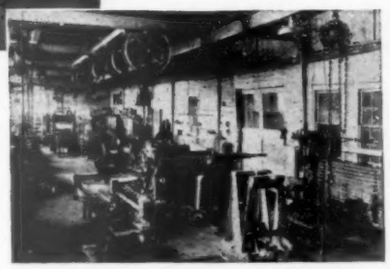

SEND FOR BULLETIN

of our regular stock of Crushers; Vibrating Screens; Ball, Rod and Tube Mills; Air Compressors; Rotary Kilns and Dryers; Hardinge Ball and Pebble Mills; Raymond and other Pulverizers; Air Classifiers, Thickeners; Wet Classifiers; Filter Presses; Continuous Filters, etc.

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4—42"x16" Allis-Chalmers "B" Crushing Rolls.
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1—Linn Tractor, 6-cyl. GAS, Pneumatics.

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GYRATORY: 42" McCully with 80% brand new parts. 21-K Gates (42"). 36" Superior McCully like new. 20" Superior McCully reduced to 16". Telsmith Nos. 4, 5, 6 & 9. Gates Nos. 10, 9, 8, 7½, 6, 5, 4 & 3. Also Austins, Kennedys and Traylors.
JAW TYPE: Traylor 84x66, 60x48, 30x60 & 24x72. Buchanan 52x72 & 30x42. Farrel 24x36 & 30x36. P&M 24x36. Good Roads 1030 & 1040. Bakstad 3-jaw 8x20. Misc. 9x16, 8x36, 15x36, Etc.
REDUC. TYPE: 6, 10 & 18" Super. McCully. 2', 3' & 4' Symons Cone. 7" Newhouse, etc.
ROLLS: Allis-C. 36x16, 40x15 & 54x24. Jeff. 30x30.
HAMMERMILLS: Williams Nos. 3, 4, 5 & 9. Others.
MILLS: Kennedy Ball 4x6, 5x6 & 5x8. Kent 34x7", 48" Fuller-Lehigh. 5'x22' Bonnot and others.

Miscellaneous Items

BIN: 150 Ton Blaw-Knox, 2-compt. & Batchers.
CARS: 6 Yd. Koppel & 20 Yd. Western Std. Ga. 14 Yd., 36" Gauge Air Dump. Others.
CONVEYORS: 24"x25', 57' & 205'. 36"x194', 60" Unit. Also 30"x200' Rubber Belt, Etc.
CRANE: Model 685 American Revolver, 100' boom.
DRAGSCRAPER: 1½ Yd. Sauerman, Elect. NEW.
DRAGLINES: Lorain Diesel, 55' boom. Bucyrus 4 & 5 Yd. steam & Diesel-Elec.
DREDGES: 8, 10, 12 & 15" Diesel, Elec., Steam.
DRILLS: Ing-Rand X-71 & D-10 and others. Sanderson Cyclone No. 14 and Loomis 6" Well.
DRILL SHARPENERS: Leyner No. 50. Armstrong 6".
ELEVATORS: 86' c-c, 30x40" buckets, 50 HP motor.
HOISTS: 100 & 150 HP Elect., single drum.
HYDRATING PLANT: No. 3 Clyde Hydrator, Etc.
KILNS: 8x110' Rotary, 9.16" plate. Others.
LOADERS: Barber-Greene No. 62 & other models.
LOCOMOTIVES: American 24 Ton Sad. Tank, S/G. 35 Ton Diesel-Elect., Std. Ga., like new. Gas. 3 to 30 Tons. 8 Ton Elect. Haulage, Etc.
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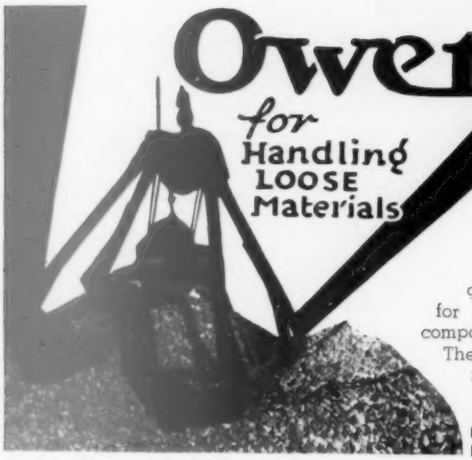
Owen Buckets



OWEN offers buckets specially adapted for handling crushed stone, gravel, sand, coal and similar materials.

Adjustable reeving assures adequate power for efficient handling of compact materials or maximum speed in taking capacity grabs of loose material. The shells are designed for rapid dumping action and great strength in comparison with their light weight.

These and many other features are described in the new Owen catalog.

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6050 Breakwater Avenue CLEVELAND, OHIO

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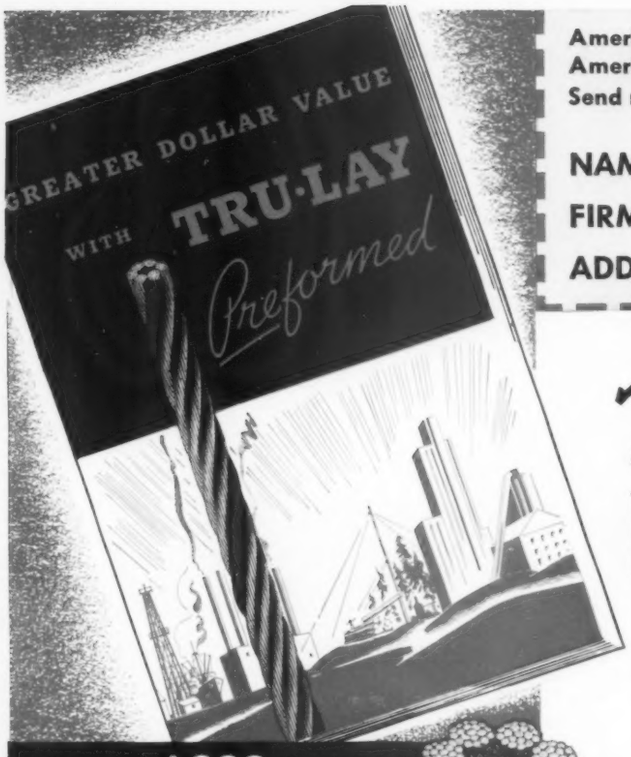

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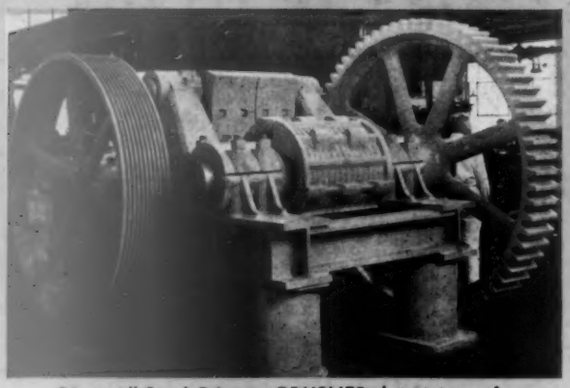
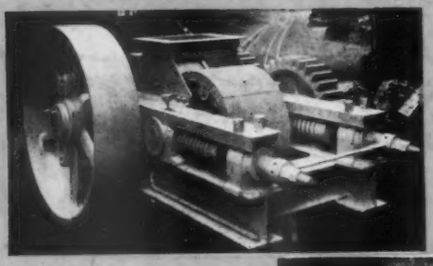
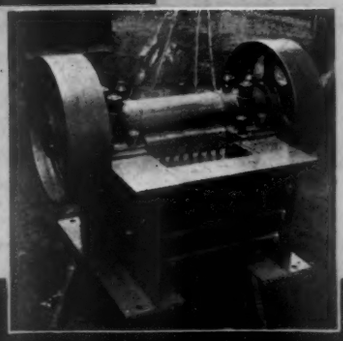


Giant All-Steel Primary CRUSHER, latest type, for shovel-loaded limestone. Quick adjustment and automatic tramp iron protection. Cover removed to show manganese segment roll, and interchangeable and reversible crushing plate liners. V-belt drive. Alemite lubrication.



All-steel, patented Segment Double roll CRUSHER. Gear guard and roll cover removed, showing segment rolls. Built for various capacities.



All-steel adjustable force-feed and discharge JAW CRUSHER. For use in portable, semi-portable and stationary plants.

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When you invest in equipment which has back of it more than a century of experience and development, you can be sure of its dependability in service and economy in operation. These are a few of the latest designs of the McLanahan & Stone complete line of crushing and washing machinery with advanced features and improved materials of construction. For further details, write for descriptive bulletins.

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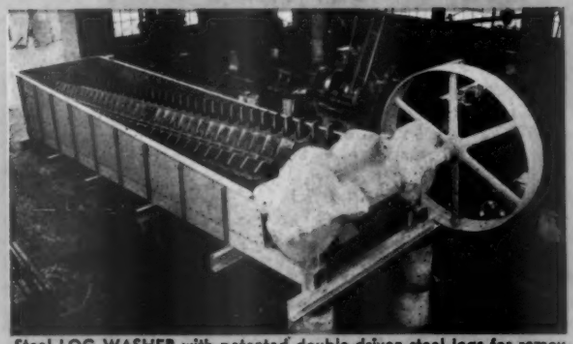
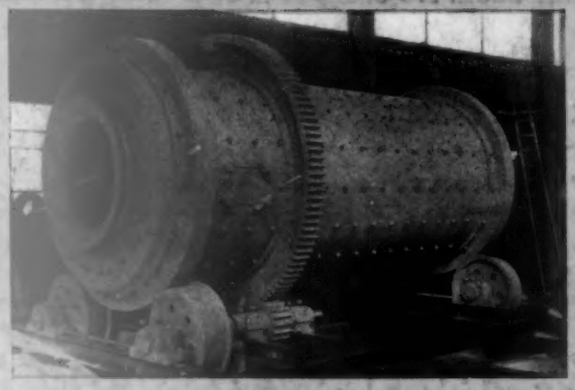


Steel LOG WASHER with patented double-driven steel logs for removing toughest clays and soft rock. Steel gears, bearings and shafts securely housed and running in oil.

WASHERS



Mammoth capacity ROCK SCRUBBER. All-steel cylinder, cut steel gears, removable locomotive tires, steel idlers and split bronze bearings.

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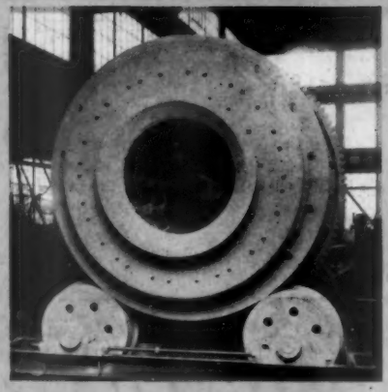
Interior view showing adjustable paddles, and chilled linings through discharge end.



SCRUBBERS